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Literature references in [ ] refer to the *Review of Applied Mycology*.
Map references are to the C.M.I. distribution maps of plant diseases.

BROWNING (J. A.). **Sources of resistance to races 6 and 13A of the Oat stem rust fungus.**—*Plant Dis. Reptr*, **42**, 8, pp. 948–952, 4 fig., 1958.

Observations at Iowa State College, Ames, showed 8 strains from the World Collection of oats, namely C.I. 2413, 2710, 3030, 3031, 3037, 3038, 3039, and 3040, to be new sources of resistance to the common races of oat stem rust (*Puccinia graminis*) [cf. **37**, p. 272], now 7, 7A, and 8, and also to the rare but potentially important races 8A and 13A.

HILLE (M.). **Zur Symptomatik und Taxonomie von Ustilago perennans Rostr. und U. avenae (Pers.) Rostr.** [On the symptoms and taxonomy of *U. perennans* Rostr. and *U. avenae* (Pers.) Rostr.]—*Phytopath. Z.*, **32**, 3, pp. 293–324,12 fig., 1958. [53 ref.]

The influence on the spikelets of *Arrhenatherum elatius* of infection by *U. perennans* and of oats (*Avena sativa* and *A. fatua*) by *U. avenae* was studied at the Institut für physiologische Botanik, Brunswick. The author concludes that *U. perennans* and *U. avenae* [**20**, p. 526; **33**, p. 450] are not conspecific because of the great difference in the symptoms, the uncertainty of the nuclear relationships in the hyphae (within the host plant) proceeding from fusion between sporidia of the 2 fungi, and the inability to transmit the smut from *Arrhenatherum elatius* to *Avena sativa*.

KLIEWER (W. M.) & KENNEDY (W. K.). **Fungicides used for the storage of moist grain.**—*Agron. J.*, **50**, 8, p. 493, 1958.

At New York State College of Agriculture, Cornell University, 150 g. samples of shelled maize (moisture content 20–28%) were treated with a large number of chemicals, alone and in combination, and then stored in 8 oz. screw-topped bottles for 105–107 days. About a third of the 46 substances examined in preliminary screening tests prevented the appearance of visible mould for 107 days. Of combinations of substances which had proved successful alone, only 22 of 112 prevented mould growth for 105 days. From further tests it was concluded that 2,4,6-trichlorophenol and 1(2,3)-chloro-4-methyl-2-pentanone at 0·25%, and 1-chloro-2-butanone, ethyl 2,3-dibromopropionate, and methyl 2,3-dibromopropionate at 0·3% were the most effective for use alone. Both 2,4,6-trichlorophenol and 3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2 thione prevented mould growth when applied in combination with the other substances mentioned at rates as low as 0·2% for the mixture. Visible mould growth was closely correlated with total loss of dry matter and the final moisture content of the grain.

When several fungicides effective in the laboratory were tested on 20 lb. lots of wheat, ear maize, and shelled maize in polythene bags, only trichlorophenol

(0·3–0·4%) consistently prevented mould in maize and wheat of 24–28% moisture content for periods up to 168 days.

Desai (M. V.) & Reddy (C. S.). **Toward a uniform seed Corn cold test.**—*Phytopathology*, **48**, 7, pp. 386–387, 1958.

It is suggested that lack of uniformity in the usual *Pythium* cold test for maize seed [**31**, p. 61], arising from variability in the abundance and degree of virulence of the species and strains present, could be overcome by use of 1 standard strain. At Iowa State College, Ames, a virulent, non-sporing isolate (species unidentified) from maize seed was preserved for at least 8–10 months at 0° C. on vermiculite treated with 1% oatmeal extract (5 g. vermiculite absorbing 10 ml.), the cultures being dried to 6–16% moisture at 29–31° (but not above) or 24–26° and sealed with wax.

Natti (J. J.). **Effect of seed treatments with antibiotics on bacterial wilt of Corn.**—*Plant Dis. Reptr*, **42**, 8, pp. 953–958, 1958.

Antibiotic maize seed treatments at the New York Agric. Experiment Station, of which details are given, showed none sufficiently effective to be considered of practical importance in controlling bacterial wilt (*Bacterium* [*Xanthomonas*] *stewartii*) [**36**, p. 466], treatments that gave control being phytotoxic.

Younts (S. E.) & Musgrave (R. B.). **Chemical composition, nutrient absorption, and stalk rot incidence of Corn as affected by chloride in potassium fertilizer.**—*Agron. J.*, **50**, 8, pp. 426–429, 1 graph, 1958.

At New York State College of Agriculture, Cornell University, increasing applications of KCl decreased the incidence of stalk rot (*Gibberella zeae* and *G. fujikuroi*) in maize [cf. **35**, p. 821], while increases of K_2SO_4 and KPO_3 had little or no effect. There was a fairly close negative correlation between percentage chloride in the ear leaf and the percentage of plants with stalk rot.

Cervantes (J.), Rodríguez (A.), & Niederhauser (J. S.). **Resistencia al virus causante del achaparramiento del Maiz.** [Resistance to the virus causing stunt in Maize.]—*Foll. tec. Ofic. Estud. esp. Méx.* 29, 18 pp., 1 fig., 1 graph, 1958. [English summary.]

In Mesa Central, Mexico, maize stunt virus [**35**, p. 602] was found to attack only maize and teocinte (*Euchlaena mexicana*). The 'tripsacoid' maize races Zapoleto chico, Tuxpeño, Tepecintle, and Vandeño showed high resistance, the only practical means of controlling the disease.

Baba (I.). **Nutritional studies on the occurrence of Helminthosporium leaf spot, and 'akiochi' of the Rice plant.**—*Bull. nat. Inst. agric. Sci., Tokyo* (Ser. D.), 7, pp. 1–157, 7 pl., 1 fig., 2 diag., 46 graphs, 1958. [Japanese. Abs. from English summary. 202 ref.]

Water and soil culture experiments and field tests indicate that the resistance of rice to *Helminthosporium* leaf spot [*Cochliobolus miyabeanus*: **37**, p. 232], which is closely correlated with 'akiochi' [**36**, p. 495] and the yield of rice, are both unfavourably affected by deficiencies in K, Si, and Mg; Mn deficiency diminishes resistance but not yield, whereas P deficiency increases resistance, on which B and Zn have little effect. Deficiency of N after ear formation, following excess of N at tillering, also increases susceptibility.

The presence of H_2S in the soil [**34**, p. 542] upsets water and nutrient absorption and translocation, and also the carbohydrate and N balance to an extent depending on the age of the plant and the conc. of H_2S. Addition of harmful organic acids (e.g. butyric and acetic) enhances the susceptibility to leaf spot and neck rot. Excess of ferrous iron injures root development, inhibits Mn uptake, and increases the susceptibility to leaf spot.

Water temps. higher or lower than the opt. (30–32° C.), high air temp. at night, and high light intensity have similar effects on nutrient absorption and susceptibility to leaf spot to those of H_2S, and also decrease the ability of the roots to oxidise FeS. High air humidity and low soil moisture also inhibit absorption and translocation of Si and K.

There appears to be no correlation between silicification of the epidermis and susceptibility to leaf spot [cf. **37**, p. 534] in Japanese rice vars. Resistance to leaf spot and 'akiochi' is correlated with resistance to root rot (judged by the degree of blackening induced when rooted plants are grown for some days in a dilute solution of H_2S) and to the intrusion of H_2S and FeS, and also with the MnO/FeO ratio.

The factors affecting leaf spot, 'akiochi', and root rot also reduce the oxidation-reduction potential of the tissue fluids, so that the latter is concluded to have a direct bearing on the resistance of rice plants to the 3 diseases.

The author considers that akiochi develops in a slightly degraded paddy soil owing to disturbance of the normal aerobic metabolism of the plant as it matures, resulting from an increasing shortage of N and other nutrients. In a highly degraded soil this deficiency is augmented by root injury due to toxic substances such as H_2S formed in the soil as the plant matures. In a poorly drained field, where abundant organic matter accumulates in the soil, the decomposition of this in midsummer causes a number of toxic substances to accumulate which inhibit nutrient uptake and upset the normal metabolism of the plant.

Schneider (H.). **Anatomy of tristeza-diseased Lemon seedlings.**—Abs. in *Phytopathology*, **48**, 8, p. 397, 1958.

Lisbon lemon seedlings were grafted when 15 cm. tall with scions from lime plants insect inoculated from [tristeza infected] sweet orange and Meyer lemon. Virus from the latter caused small yellow leaves with curved midribs at 15 weeks and deterioration of feeder roots at 27 weeks; linear growth was half that of the controls but radial growth at the graft union was not checked. Virus from both sources caused generalized chromatic cell formation though this symptom did not reach the meristem of Meyer lemon. That from sweet orange caused slight sieve-tube necrosis in feeder roots and occasional excess phloem in the roots, but that from Meyer lemon caused extensive sieve-tube necrosis, considerable excess phloem, little secondary xylem, and some gummosis in feeder roots.

Giacometti (D. C.) & Costa (A. S.). **Nursery behaviour of infected West Indian Lime scions on tristeza tolerant and intolerant rootstocks.**—*Plant Dis. Reptr*, **42**, 8, pp. 928–931, 2 fig., 1958.

In a nursery at the Instituto de Ecologia e Experimentação Agrícolas, Rio de Janeiro, Brazil, buds from West Indian lime seedlings infected with 3 mild sources of tristeza virus [cf. **35**, p. 447] by budding had made better growth after 6 months on Florida rough lemon and sour orange than buds from seedlings infected with a severe strain, which induced symptoms similar to seedling yellows [**32**, p. 77] on the sour orange rootstock.

Childs (J. F. L.), Norman (G. G.), & Eichhorn (J. L.). **A color test for exocortis infection in Poncirus trifoliata.**—*Phytopathology*, **48**, 8, pp. 426–432, 4 fig., 1958.

At the U.S. Dept Agric., Orlando, Florida, it was found that staining cross sections of bark of *P. trifoliata* with phloroglucinol-HCl gave a typical red colour in certain ray cells in the presence of exocortis virus, which often makes these cells appear opaque in unstained sections. The phloroglucinol reaction is transitory, but a more permanent record is obtainable by staining corresponding sections in safranin-light green, which substantiates the diagnosis. The phloroglucinol method gave 98·6%

correct diagnoses in plants infected for 2 yr.; it indicated infection before bark scaling occurred, and the presence of other citrus viruses did not affect the reaction. Bark specimens of budded trees should be taken near the bud union, particularly for recent infections. On other citrus varieties the stain, though sometimes positive, was not so consistent.

WEATHERS (L. G.). **Cross-protection studies with yellow-vein and certain other viruses of Citrus.**—Abs. in *Phytopathology*, **48**, 8, p. 399, 1958.

West Indian lime seedlings infected singly with 5 viruses were then graft inoculated with citrus yellow vein virus. Symptoms of this virus, developing on all the plants in 3–6 weeks, were intensified by cachexia [xyloporosis] and vein enation infection, slightly suppressed by psorosis, and unaffected by tristeza and exocortis. Vein enation symptoms were intensified by yellow vein, but the symptoms of the others were not affected. These reactions suggest that citrus yellow vein is unrelated to the other 5 viruses.

TSAO (P. H.). **Serial dilution method for estimating disease potentials of Citrus Phytophthoras in soils.**—Abs. in *Phytopathology*, **48**, 8, pp. 398–399, 1958.

To estimate the population of *Phytophthora citrophthora* and *P. parasitica* in soil [**37**, p. 720] a well mixed sample was diluted 1/2–1/64 with sterile soil. The samples (25 ml.) and an undiluted portion were placed in 1 pint paper cups with 150 ml. water and 2 lemon fruits at 25° C. for 6 days, the disease potential index being the reciprocal of the highest dilution that induced brown rot lesions.

MARTIN (J. P.) & ERVIN (J. O.). **Changes in fungus population of California old Citrus orchard soils when cropped to Orange seedlings in the greenhouse.**—*Soil Sci.*, **86**, 3, pp. 152–155, 1958.

In the greenhouse at the University of California Citrus Experiment Station, Riverside, 2 crops of sour or sweet orange seedlings were grown consecutively each for 7–8 months in citrus orchard subsoils (6–36 in. depth) in 3-gal. crocks. The total population of fungi [cf. **36**, p. 242] was found to increase, rising during the growth of the 1st crop from 33,000 to 70,000/g. dry soil and to 90,000 during the 2nd; the number of spp. detected fell from 17 to 9 during the growth of the 1st crop and then remained approximately the same.

Certain spp., e.g. *Fusarium solani*, *Pullularia pullulans*, and *Penicillium lilacinum*, which were present in relatively high numbers in the field soils, persisted to a comparable extent in the greenhouse. Among the spp. which decreased in relative numbers were *Stysanus stemonites*, *Pyrenochaeta* sp., and *Gliomastix convoluta*, while *Thielaviopsis basicola* and *Penicillium nigricans* increased. During the 2nd cropping *T. basicola* made an immense gain, accounting for 19% of the colonies as compared with $< 1\%$ in the original soil.

CALAVAN (E. C.) & CHRISTIANSEN (D. W.). **Production of ferment gum disease in Marsh Grapefruit trees by fungus inoculation.**—Abs. in *Phytopathology*, **48**, 8, p. 391, 1958.

Ferment gum, a major disease of grapefruit in California, is characterized by gum exudation from blisters under the bark, zones of necrotic wood with pink to orange margins, a brown wood rot extending from wound infection sites, and general deterioration of affected branches. It resembles Rio Grande gummosis, attributed in Texas to *Diplodia natalensis* [cf. also **32**, p. 480]. A wood rotting basidiomycete [undetermined] was shown to be the primary cause, and in 37 of 69 wound inoculations symptoms developed within 13 months. Other organisms isolated gave negative results.

TANG (C.-Y.). **The epidermal structure of Citrus in relation to its susceptibility to canker infection.**—*Acta phytopath. sinica*, **4**, 1, pp. 56–69, 1 pl. (20 fig.), 3 fig., 1 graph, 1958. [Chinese. Abs. from English summary.]

Infection of citrus by *Xanthomonas citri* [cf. **35**, p. 636] was found to be related to the density and maturity of the stomata [**1**, p. 12] and lenticels, being heaviest during their development. Parts with mature or undeveloped pores (old shoots or terminal growth) were resistant. Fruit is exposed to infection for a longer period and is most susceptible in early June but there is little infection after 60 days of growth. Susceptibility is also correlated with density and size of the stomata in the descending order: sweet orange, sour orange, lemon, and *Poncirus trifoliata*.

SANDERS (F. R.). **Report of the Coffee Research and Experimental Station, Lyamungu, Moshi, Tanganyika, 1956–57.**—14 pp., 2 pl., [1958].

In the section on pests and diseases (pp. 11–14) it is noted that the stem-pitting or 'bottling' present at the Station [cf. **34**, p. 34; **37**, p. 636] appears to affect only trees planted since 1953. The main stem swells 6–12 in. above the ground and then tapers to a normal thickness, the bark is thickened, and the wood beneath ridged and furrowed, or pitted; 2 photographs illustrate the symptoms.

CULOT (J. P.), VAN WAMBEKE (A.), & CROEGAERT (J.). **Contribution à l'étude des déficiences minérales du Caféier d'Arabie au Kivu.** [A contribution to the study of the mineral deficiencies of Arabian Coffee in Kivu.]—*Publ. Inst. nat. agron. Congo belge*, Sér. sci., 73, 105 pp., 2 col. pl., 7 graphs, 1 map, 1958. B. Fr. 120. [47 ref.]

The results are presented of this investigation conducted in May and June 1956. The subject is treated in 3 sections: the local ecological and edaphic conditions of the plantations; the causes of the deficiencies and the variations they induce in the chemical composition of the foliage [cf. **36**, p. 101]; and the edaphic demands of the plant. The leaf symptoms caused by combined K and N and by Mn deficiency are illustrated in colour and a table (pp. 98–99) sets out the chief symptoms of each deficiency, the determining edaphic conditions, and suitable control measures.

GARBER (R. H.) & HALISKY (P. M.). **Influence of soil temperature on Verticillium wilt of Cotton.**—Abs. in *Phytopathology*, **48**, 8, p. 393, 1958.

Wilt-susceptible Delta-Pine 15 cotton inoculated with *V. albo-atrum* [**35**, p. 450] and grown in soil at 15, 20, 25, and 30° C. developed av. infection percentages of 58, 75, 85, and 59. There were no symptoms at 35°. On potato dextrose agar max. growth occurred at 18, 21, and 24° in the range 12–39°. There was no measurable growth at 33° or above.

KUBLANOVSKAYA (Mme G. M.). Актиномицеты против увядания Хлопчатника. [Actinomycetes against Cotton wilt.]—*Zashch. Rast., Moscow* [*Plant Prot., Moscow*], *1958*, 4, pp. 19–22, 1 fig., 1958.

In field and laboratory tests in 1950–56, at the Uzbek Agricultural Academy, cotton seed cake with actinomycetes was introduced into sterile and non-sterile soil at 20–25% humidity and 20–25° C. every 4–5 days. As the actinomycetes increased, cotton wilt [*Verticillium dahliae*: **37**, p. 585] was checked and the yield increased by 10–12%.

HOUSTON (B. R.), KNOWLES (P. F.), & ASHWORTH (L. J.). **The determination of pathogenic races of Fusarium oxysporum f. lini.**—Abs. in *Phytopathology*, **48**, 8, p. 394, 1958.

Sixty isolates of *F.o.* f. *lini* [*F. lini*: **37**, p. 43] from vascular tissue, 2–3 in. above the

soil line, of flax plants from N. Dakota, Minnesota, and California, were inoculated to 6 lines derived from Punjab 53 and 47 (C.I. 1115), Dakota (C.I. 1071), and Argentine (C.I. 463) in the greenhouse. Five pathogenic races were identified, all occurring in each of the States; 3 were separable by the presence or absence of 1 or more of the genes A, B, and C [**35**, p. 609], the complementary action of which in the dominant is necessary for resistance to certain races.

Klug (R. J.). **Physiological studies of mutants of Colletotrichum linicolum induced by radiation.**—*Diss. Abstr.*, **18**, 1, p. 35, 1958.

At the University of Minnesota mutants of a single biotype of *C. linicola* [**34**, p. 367], induced by α-radiation from polonium-210, were tested on flax seedlings var. Punjab. They ranged from avirulent through intermediate to one more pathogenic than the parent. All were auxo-autotrophic but there were variations in cellulolytic and amylase activity. Filamentous, filamentous-beaded, beaded, and spheroid mycelial types were formed on media of increasing osmotic pressure. The spheroid form consisted of individual cells which apparently increased by fission; they were as pathogenic as conidia in inoculations. Such cells may occur in soils during periods of reduced soil moisture, serving as means of survival and dissemination.

Sy (C.-M.) & Lo (Y.-W.). **Studies on the control of Kenaf anthracnose (Colletotrichum hibisci Pollacci).**—*Acta phytopath. sinica*, **4**, 1, pp. 25–55, 1958. [Chinese. Abs. from English summary.]

The fungus is mainly carried in the seeds of kenaf [*Hibiscus cannabinus*: cf. **37**, p. 169]; rain, wind, and insects are involved in secondary infections. It remains viable in seed for 31 months and hot-water treatment after presoaking is not sufficient to kill it completely [but cf. loc. cit.]. The spores can survive 2 yr. in dry soil, but die within 1 in moist. All the northern vars. such as Tashgan and Xuaneng No. 1 are very susceptible, but the southern vars. like Madras Red have proved resistant when grown in the north.

Rudakov (O.). Серая гниль Кенафа и меры борьбы с ней. [Grey mould of Kenaf and its control.]—С. х. Киргизии [*Sel. kh. Kirgiz*], *1956*, 12, pp. 17–21, 1956. [Abs. in *Referat. Zh. Biol.*, *1958*, 8, p. 189, 1958.]

The symptoms of the physiological effect on the plant and the decrease in yield caused by grey mould [*Botrytis cinerea*: **36**, p. 645] on kenaf [*Hibiscus cannabinus*] in Kirgiz S.S.R. are described. The best control was obtained with 5% thiram suspension at 250 l./ha. or 2·5% at 500 l./ha.

Boyce (W. R.). **Resistance to yellow-leaf disease in Phormium tenax Forst. and the occurrence of delayed expression of symptoms.**—*N.Z.J. agric. Res.* (formerly *N.Z.J. Sci. Tech.*, Sect. A), **1**, 1, pp. 31–36, 1958.

At the D.S.I.R., Christchurch, SS (a cultivar of *P. tenax*), S_1 (1st inbred generation progeny of SS), and S_2 (2nd inbred generation progeny of the now extinct susceptible cultivar 301) were exposed to leafhoppers (*Oliarus atkinsoni*) infected with phormium yellow leaf virus [cf. **33**, p. 229]. SS was resistant (50% healthy after 28 months), S_2 highly susceptible, and S_1 intermediate (14%). The resistance of SS may be due to partial tolerance and it should not be distributed from infected areas. During these experiments and subsequently there was evidence of a long delay in symptom expression.

Gerlach (W.), Sauthoff (W.), & Pag (H.). **Untersuchungen über die Fusarium-Welke an Aechmea fasciata (Lindl.) Bak. (Erreger : Fusarium bulbigenum Cke et Mass. f. aechmeae Gerlach et Sauthoff n.f.).** [Studies on the *Fusarium* wilt of

A. fasciata (Lindl.) Bak. (Causal agent: *F. bulbigenum* Cke & Mass. f. *aechmeae* Gerlach & Sauthoff n.f.).]—*Phytopath. Z.*, **32**, 4, pp. 416–432, 12 fig., 1958. [English summary.]

Further information [**37**, p. 356] is presented from the Laboratorium für Zierpflanzenbau, Institut für Mykologie, Berlin-Dahlem. The morphological characters of the sole pathogen isolated are described. Its pathogenicity was demonstrated by infection experiments and reisolations. In addition to *A. fasciata*, *F.b.* f. *aechmeae* attacked at least 4 further *A.* spp. Possibilities of control are discussed.

Hollings (M.). **Anemone brown ring—a virus disease.**—*Plant Path.*, **7**, 3, pp. 95–98, 1 pl., 1958.

In Nov. 1956 1 plant was found in an anemone field near Cheddar bearing brown rings 2–4 mm. diam., with pale tan centres, on the older leaves. The rings darkened and many enlarged and coalesced to form large dark brown areas enclosing a few pale spots. The older leaves later became totally necrotic, younger leaves had only a slight, general chlorosis, and the middle leaves bore faint, chlorotic spots which slowly developed brown margins. The affected plants, which died, yielded an apparently new virus. This was ascertained to cause the disease, for which the name 'anemone brown ring' [**37**, p. 219] is proposed. *Chenopodium amaranticolor* proved a useful indicator plant for anemone brown ring, showing local diffuse chlorotic spots, 2–2·5 mm. diam., after 8–12 days; these lesions later enlarged slightly and developed reddish-brown necrotic margins. Other susceptible and non-susceptible plants are listed. The dilution end point of infected anemone leaf sap was 1/100, the T.D.P. (at 1/2 dilution) between 60 and 65° C. for 10 min. heating, and the longevity 10–15 days at lab. temp. Attempts to transmit the virus by aphids and soil were unsuccessful.

Brierley (P.) & Smith (F. F.). **Some characteristics of eight mosaic and two rosette viruses of Chrysanthemum.**—*Plant Dis. Reptr*, **42**, 6, pp. 752–763, 2 fig., 1958.

Mosaic viruses from the vars. Superlative, Good News, Yellow Doty, Nightingale, Improved Bronze Daisy, September Morn, John Cooper, and 'Hinckley' and rosette viruses from Ivory Seagull and Yellow Rayonante were distinguished at Beltsville, Maryland, on the basis of the reactions of 6 chrysanthemum vars., petunia, and cineraria, which are fully described. Eight of the 10 source vars. carried infection without symptoms; such carriers are common in chrysanthemum but their cultivation in the greenhouse leads to no commercial losses as these viruses are not transmissible by handling or by any known vector.

Shanks (J. B.) & Link (C. B.). **Cultural factors and the incidence of certain soil-borne diseases of Poinsettia.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 522–536, 4 fig., 1958.

In this further account from the University of Maryland of root rots of poinsettia [*Euphorbia pulcherrima*: **35**, p. 191] it is recorded that *Thielaviopsis basicola* was proved to be the primary cause of late season rots. *Rhizoctonia* [*Corticium*] *solani*, mostly affecting young plants, could also affect older plants when associated with some other pathogen, while *Pythium* spp. attacked in both the early and late phases; both these fungi were favoured by pH 4·5. *Meloidogyne incognita acrita*, which caused root-knot and reduced plant growth, did not interact with the 3 fungi. PCNB soil drenching controlled *C. solani*, but fungicides used against *Pythium* spp. were damaging to the plants. Increased plant growth occurred sometimes in the presence of 1 or more of the non-pathogenic isolates of *Thielaviopsis*, *C. solani*, or *Pythium*.

Trojan [? Krista]. **Erkrankungen des Gummibaumes (Ficus elastica).** [Diseases of the Rubber tree (*F. elastica*).]—*Pflanzenschutz*, **10**, 3, pp. 38–39, 2 fig., 1958.

A popular note on the pests and diseases of *F. elastica* when grown as a house plant. Corky callosities on the petioles and corky pustules on the underside of the leaves follow exposure to excessive soil moisture with poor lighting and low temperature. Anthracnose, caused by unspecified *Gloeosporium*, *Phyllosticta*, or *Septoria* spp. and encouraged by variations of temperature and by unbalanced applications of N, is combated by removal of the affected leaves and repeated spraying or dusting with captan or zineb.

Sharma (B. B.). **Stem-canker, a sclerotial disease of Hollyhock (Althea rosea Cav.) from India.**—*Curr. Sci.*, **27**, 8, pp. 304–305, 1 fig., 1958.

The observation of *Sclerotinia sclerotiorum* on hollyhocks [cf. **13**, p. 638] at Lucknow in 1951 constituted a new host record for India.

Bald (J. G.), Chandler (P.A.), Lenz (J. V.), Sciarowi (R. H.), & Paulus (A. O.). **Root rot of Easter Lilies.**—*Calif. Agric.*, **12**, 4, pp. 3, 14, 1 fig., 1958.

Part of this work has already been noticed [**36**, p. 700]. Nutrient agar has proved highly efficient for the production of infection-free bulbils from scales: bacterial and fungal infections, where present, are encouraged by the medium and thus readily detected. In 1955, 1,600 small plants raised from treated bulb scales and planted out in methyl bromide-fumigated plots grew with exceptional vigour, as did others in the following year. A mixture of 2 qt. lysol with 2 lb. ferbam in 100 gal. water was satisfactory as a fungicidal dip for the bulbs, but replacement of the lysol with 2 lb. PCNB gave better results.

Wenham (H. T.). **Septoria drummondii Ell. et Ev., a common seed-borne pathogen in European lines of Phlox drummondii Hook. seed imported to New Zealand.**—*N.Z.J. agric. Res.*, **1**, 4, pp. 486–488, 2 fig., 1958.

From the Massey Agricultural College, Palmerston North, it is reported for the first time that *S. drummondii*, of world-wide distribution on *P. drummondii* [cf. **20**, p. 469], is seed transmitted, the inoculum either contaminating the seed surface or being deep seated. The disease causes chlorotic patches on the cotyledons, turning into brown, pycnidia-covered lesions, which also appear later on the leaves, stems, and flower parts.

McClellan (W. D.), Taylor (E. A.), & Smith (F. F.). **Winter treatments of dormant Roses and their relation to blackspot and spider mite control.**—*Phytopathology*, **48**, 8, pp. 408–410, 1 fig., 1958.

Further investigation at Beltsville, Maryland [**36**, p. 764], using 5 vars. of roses in 120 plots, showed that the most effective control of *Diplocarpon rosae* was obtained by pruning to within 1–2 in. of the bud union. Various spray treatments all proved ineffective. Though such pruning reduced early flower yields, the ultimate total yields equalled those of unpruned bushes.

Massey (L. M.) & Naegele (J. A.). **Tests with fungicides for blackspot. Second Progress Report.**—*Amer. Rose Annu.*, **41**, pp. 49–60, 1956. [Received Aug. 1958.]

In the 1955 trials [cf. **36**, p. 322] at New York State College of Agriculture, Ithaca, on the control of blackspot (*Diplocarpon rosae*) on roses 30 or more fungicides were tested. The results are tabulated.

Mühle (E.). **Phoma wilting of Valerian.**—*Planta med.*, **6**, pp. 89–91, 1958. [*Chem. Abstr.*, **52**, 16, col. 14064*i*–14065*a*, 1958.]

Valeriana procurrens was resistant to wilt caused by *P.* sp. on *V. pratensis* and *V. sambucifolia* at the Institut für Phytopathologie, Leipzig, Germany. Seed treatment with mercurials was ineffectual owing to the distance of the mycelium from their sphere of activity; the rapid removal of diseased plants from the field is recommended to prevent the spread of infection. Seed-bed treatment with phomasan (200 g./cu. m. soil) or olpisan (250 g.) controlled the wilt without damage to the young plants.

Beaumont (A.), Cleary (J. P.), & Bant (J. H.). **Control of damping-off of Zinnias caused by Alternaria zinniae.**—*Plant Path.*, **7**, 2, pp. 52–53, 1958.

At the National Agricultural Advisory Service, Leeds, Polar Bear zinnia seed, untreated, steeped in 1/1,200 $HgCl_2$ solution for 25 min. and washed in cold running water for 30 min., treated in hot water at 110, 120, 122, 125, and 130° F., or dusted with 50% thiram or ceresan developed, respectively, 80, 22, 68, 46, 44, 38, 10, 0, and 0% infection by *Alternaria zinniae* [cf. **31**, p. 239]. The corresponding figures for Grenadier were 66, 6, 80, 46, 26, 34, 14, 0, and 0%. Large-scale field trials in 1955 and 1956 indicated that thiram dust is the most convenient and satisfactory treatment. A test of 25 vars. showed that no var. was entirely free from seed infection, which ranged from 20–85%.

Putt (E. D.). **Note on differences in susceptibility to Sclerotinia wilt in Sunflowers.**—*Canad. J. Pl. Sci.*, **38**, 3, pp. 380–381, 1958.

Marked inconsistencies from year to year in the susceptibility of various lines of sunflower to *S. sclerotiorum* [**29**, p. 291] are reported from the Canada Dept Agric., Morden, Manitoba, lines CM 10 and CM 11 having the lowest infection ratings during 1953–56 (8·3–30·1 and 16·7–32·6, respectively). Despite inconsistency it is apparent that varietal differences which can form a basis for breeding do occur.

Slykhuis (J. T.). **A survey of virus diseases of grasses in northern Europe.**—*F.A.O. Pl. Prot. Bull.*, **6**, 9, pp. 129–134, 1958. [19 ref.]

This is an expanded account of work already noticed [**37**, pp. 363, 631]. Barley stripe mosaic virus was found in experimental plots in England, France, and Germany. The European type of cereal [wheat] striate mosaic may be very destructive in areas where the vector, *Delphacodes pellucida*, is abundant.

Braverman (S. W.). **The physiology and pathogenicity of Helminthosporium species on forage crops.**—*Diss. Abstr.*, **27**, 12, p. 2776, 1957.

In seedling tests at Pennsylvania University with isolates of 9 spp. of *Helminthosporium*, *H.* [*Pyrenophora*] *avenae* infected oat [**36**, p. 641], tall oat grass [*Arrhenatherum elatius*], barley [cf. **36**, pp. 10, 11], and orchard grass [*Dactylis glomerata*]; *H. phaeocomes* infected the last named; *H. dictyoides* from the fescues [*Festuca* spp.] infected these [**36**, p. 650], while *H. dictyoides* from rye grasses [*Lolium* spp.] and hybrids and *H. siccans* infected these and the fescues as well. *H.* [*P.*] *bromi* infected brome grass [*Bromus*: **36**, p. 192], *H. erythrospilum* red top [*Agrostis alba*], *H.* [*P.*] *teres* caused net blotch of barley [**37**, p. 405], and *H. gramineum* stripe [**36**, p. 394], while *H. catenarium* was non-pathogenic.

H. catenarium and *H. dictyoides* had conidia with tapering apices, not so in the other 7, which were closely related, with the exception of *H. siccans* and *H. erythrospilum*. The average conidial length in *P. bromi* and *H. catenarium* was significantly greater than in the others, which required physiologic and pathologic criteria for adequate delineation.

On agar with malachite green (1 and 10 p.p.m.), crystal violet (10 and 20 p.p.m.),

or ethanol *P. avenae* produced significantly larger colonies than *P. teres*, *H. gramineum*, or *H. phaeocomes*. On Czapek-Dox the pigments produced were: *P. avenae* red, *P. teres* and *H. gramineum* orange, *H. dictyoides* var. *phlei* and *H. dictyoides* from the fescues yellow, *H. siccans* pink-red, and *H. erythrospilum* pink. On the basis of these results two forms of *H. dictyoides* are proposed: f. *dictyoides* and f. *perenne*.

Jenkinson (J. G.). **Ergot infection of grasses in the south-west of England.**—*Plant Path.*, **7**, 3, pp. 81–85, 2 graphs, 1958.

Infection of grasses by ergot (*Claviceps purpurea* and *C. microcephala*), especially *Lolium perenne* and *L. multiflorum*, is common in SW. England, but has not been found on wheat or rye. The 1st signs of germination, which usually occurs about the 1st week in June, depending on rainfall, are the appearance in the sclerotia of small, longitudinal cracks from which the stromata develop. About 7 days usually elapse before ascospores are mature; discharge occurs at intervals over about 14 days.

The percentage of infected inflorescences increases rapidly about the beginning of July, and mature ergots appear by the end of July or early Aug. Experimental evidence indicated max. infection may be in grasses flowering after Aug.; some inflorescences flowering at the end of Aug. had 88% infection in late Sept. This rapid increase would appear to be due to the conidial state, which may possibly overwinter in the Scilly Isles, if not in Devon. The max. number of ergots/acre occurs about mid Aug. and then rapidly declines as inflorescences become fewer.

The only practical method of control is by cutting after grazing. The critical flowering period would appear to be from the beginning of July until the end of Sept., and if the topping of pastures grazed during this period was adopted as a routine practice the incidence of ergot would become negligible.

Cunningham (I. J.). **Non-toxicity to animals of Ryegrass endophyte and other endophytic fungi of New Zealand grasses.**—*N.Z.J. agric. Res.*, **1**, 4, pp. 489–497, 1958.

Feeding experiments at the Animal Research Station, Wallaceville, on birds and mammals with cultures of the endophytes from perennial ryegrass [*Lolium perenne*: **19**, p. 477], tall fescue [*Festuca arundinacea*] (*Epichloe typhina*) [**22**, p. 138], and darnel [*Lolium temulentum*] [loc. cit.], and the blind-seed fungus (*Gloeotinia temulenta*) [**35**, p. 193] indicated that no toxic effects were produced.

Diachun (S.) & Henson (L.). **Red Clover clones as local-lesion hosts for Bean yellow mosaic virus.**—*Phytopathology*, **48**, 7, pp. 369–371, 1 fig., 1958.

In further studies at the University of Kentucky, Lexington [cf. **35**, p. 682], several clones of Kenland red clover developed local necrotic lesions when inoculated with bean yellow mosaic virus. Clone Ky C71–8 proved useful as a lesion host for comparing the infectivity of different inoculum preparations. Clones Ky C40, C40–1, and C40–2 show promise as breeding stock for resistance.

Leach (C. M.). **Additional evidence for seed-borne mycelium of Sclerotinia sclerotiorum associated with Clover seed.**—*Phytopathology*, **48**, 7, pp. 388–389, 1 fig., 1958.

At Oregon State College, Corvallis, *S. sclerotiorum* grew from the surface of untreated crimson clover seed plated on malt agar [cf. **29**, p. 621; **34**, p. 597]. The colonies did not arise from sclerotia, are unlikely to have come from ascospores because apothecia are rarely found during the flowering period, and must therefore have developed from mycelium associated with the seed. Surface disinfection reduced but did not eliminate infection. The seed-borne mycelium lost viability after 2 yr. storage.

Graham (J. H.). **Effect of gibberellic acid on damping-off of Ladino White Clover.**—*Plant Dis. Reptr*, **42**, 8, pp. 963–964, 1958.

In greenhouse experiments at University Park, Pennsylvania, application of gibberellic acid at 10 and 40 p.p.m. to Ladino white clover seed increased the amount of pre-emergence damping-off in soil inoculated with *Pythium debaryanum* [cf. **36**, p. 593]. Post-emergence damping-off was also increased significantly in soil infested with *P. debaryanum*, *Rhizoctonia* [*Corticium*] *solani*, and *Fusarium* '*roseum*'. The induced etiolated growth of the seedlings was apparently responsible, the fungi being unaffected by the chemical in culture.

McDonald (W. C.). **The Pseudoplea-Stemphylium complex on Alfalfa.**—*Phytopathology*, **48**, 7, pp. 365–369, 1 fig., 1958.

These studies at the Canada Dept Agric., Winnipeg, Manitoba, on *P. trifolii* and *Pleospora herbarum* isolated from lucerne [cf. **35**, p. 21], red clover, and sweet clover [*Melilotus*] from several widespread localities have been noticed in a shorter form [**37**, p. 365]. The former produced perithecia on lucerne leaflets on filter paper over a thin layer of vermiculite, but not conidia. *P. herbarum* caused typical leaf spotting and stem blackening when culture suspensions were sprayed on to 3-month old lucerne plants; *Pseudoplea trifolii* failed to infect by this method. Each fungus could colonize lesions formed by the other, thus complicating field diagnosis, but there was no evidence that *P. trifolii* ever gave rise to a conidial state conforming to *S. botryosum*, whereas *Pleospora herbarum* is consistently reported as the perfect state of *S. botryosum* both on lucerne and other hosts [cf. **36**, p. 325].

Weltzien (H. C.). **Untersuchungen zur Frage der Beizung von Luzernesaatgut.** [Studies on the question of disinfection of Lucerne seed.]—*Phytopath. Z.*, **32**, 3, pp. 245–256, 4 graphs, 1958.

In further work [**37**, p. 496] at the Institut für Pflanzenschutz der Landwirtschaftlichen Hochschule, Stuttgart-Hohenheim, Germany, the germinability of lucerne seed was not affected by the 12 preparations tested. However, those with a Hg base (ceresan dry) alone or plus quinonoximbenzoylhydrazone (cerenox-special) or cerenox alone greatly reduced seedling height in relation to the concentration, and had an even greater adverse effect on the roots; their phytotoxicity was independent of the nature of the substrate and irreversible. On the other hand, dry treatment with orthocide 50 (all dosages) increased linear growth.

In the greenhouse tests there was a notable reduction in seedling diseases, chiefly *Pythium ultimum* and *P. debaryanum*, by orthocide 50, mercury+cerenox-special, and dithane [Z-78] often with a doubling of the number of healthy plants. This effective disinfection was not achieved with excessively close sowing. The protection given by orthocide 50 and cerenox-special lasted 20–25 days from the date of sowing; the former is recommended at 0·5% for field use.

Millikan (C. R.). **Nutrient deficiency symptoms in Lucerne and some pasture Legumes.**—*J. Dep. Agric. Vict.*, **56**, 8, 16 pp. (between pp. 511–531), 4 col. pl., 23 fig., 1958.

As the result of water and soil culture experiments at the Plant Research Laboratory, Burnley, symptoms of deficiencies of K, N, P, Mg, Ca, Fe, B, Mn, Zn, and Cu in lucerne are described, and of some of these in *Medicago tribuloides*, *M. arabica*, *Trifolium repens*, *T. pratense*, *T. glomeratum*, *T. hybridum*, and *T. fragiferum* [cf. **33**, p. 300; **35**, p. 355].

The tests were conducted at all seasons of the year. K deficiency symptoms varied from season to season.

Yakovleva (Mme Z. M.). Влияние грибов из рода **Alternaria** на полевую всхожесть Эспарцета. [The influence of fungi of the genus *Alternaria* on the field germination of Sainfoin.]—Труд. Инст. Микробиол. Вирусол., А Н Казак ССР [*Trud. Inst. Microbiol. Virol., Acad. Sci. Kazakh S.S.R.*], **2**, pp. 61–65, 1958.

A. tenuis (the most widespread), *A. humicola*, and *A. geophila*, isolated from sainfoin [*Onobrychis viciifolia*] in Kazakh S.S.R., were found in inoculation experiments to decrease germination and the early stages of plant growth to half of that in uninfected plots. The seed pods are the main sources of infection and good control was obtained by removing them.

Lindberg (G. D.). **A serious disease of Melilotus indica associated with soils infected with Pythium.**—Abs. in *Phytopathology*, **48**, 8, p. 395, 1958.

Yields of *M. indica* grown as a green manure crop with sugarcane in *Pythium* infested soils have been reduced 'several hundred per cent.' by a damping-off of seedlings caused by *P.* (?) *ultimum*, and a subsequent stunting, yellowing, and premature defoliation. Both conditions were reproduced in the greenhouse by soil inoculation with the fungus [cf. **33**, p. 608].

Morvan (G.). **Problèmes posés par les maladies à virus à l'arboriculture fruitière française.** [The problems posed by virus diseases in French tree fruit culture.] —*Bull. tech. Ing. Serv. agric.* 123, pp. 567–588, 1 col. pl. (8 fig.), 35 fig., 1 map, 1957.

In the 1st part of this publication the author briefly discusses the nature of virus diseases of fruit trees, their study and control. The 2nd deals with the practical and economic aspects and the use of an indexing system to ensure distribution of healthy trees only. The symptoms of the chief virus diseases of pear, apple, cherry, peach, apricot, and plum now known to occur in France are described and there is a section on anomalies not due to known viruses, viruses causing faint symptoms, and latent viruses. In an appendix (pp. 20–22) the virus diseases of fruit trees in Europe are listed, with a brief note of their symptoms and an indication of those found in France.

Bömeke (H.). **Alle Obstbaugebiete müssen sich heute um die Virusbekämpfung bemühen.** [All fruit-growing areas must today practise virus control.]—*Mitt. ObstbVersRing Alt. Land.*, **11**, 9, pp. 227–232, 2 fig., 1956.

The author very briefly outlines the position of current research into a number of virus diseases of fruit trees with emphasis on those in the Lower Elbe region.

Georghiou (G. P.). **Spray programmes for fruit trees.**—*Leafl. Dep. Agric. Cyprus* A 5, 19 pp., 1956. [Received 1958.]

Schedules are given for control of insect pests and fungal diseases under Cyprus conditions. Included are those for *Gymnosporangium sabinae* [*G. fuscum*: **36**, p. 278] on pear, apple scab (*Venturia inaequalis*), *Sclerotinia fructigena* on apricot and almond, *Taphrina deformans* on plum and almond, and *Uncinula necator* and *Plasmopara viticola* on vine.

Apples and Pears.—*Bull. Minist. Agric., Lond.*, 133 (3rd edition), 135 pp., 12 pl., 17 fig., 9 diag., 5 maps, 1958. 7*s*.

The sections on pests and diseases (pp. 82–94, 127–128), including virus diseases, have been rewritten. Storage is dealt with on pp. 105–111, 128–130.

Hunter (J. A.), Chamberlain (E. E.), & Atkinson (J. D.). **Note on transmission of Apple mosaic by natural root grafting.**—*N Z.J. agric. Res.* (formerly *N.Z.J. Sci. Tech.*, Sect. A), **1**, 1, pp. 80–82, 1 fig., 1958.

In further work at Mt. Albert [cf. **36**, p. 325] alternate 1-yr.-old apple seedlings in

a single row, 10 in. apart, were grafted with apple mosaic virus-infected scions 18 months after planting. After a further 4 months 5 of the 60 ungrafted trees developed symptoms. Excavation showed natural root grafting with adjacent infected trees in each case [cf. **35**, p. 615].

Gilmer (R. M.). **Two viruses that induce mosaic of Apple.**—*Phytopathology*, **48**, 8, pp. 432–434, 1958.

At New York Agricultural Experiment Station, Geneva, virus isolates inducing apple mosaic in apple [**37**, p. 586], 4 from apple and 2 from cherry [**35**, p. 686], proved to be bud transmissible to apple, and with the exception of 1 from cherry, to *Chaenomeles lagenaria*, but not to quince, pear, hawthorn (*Crataegus chlorosarca*), or *Sorbus aucuparia*, nor by expressed sap or dodder to a number of herbaceous hosts. The symptoms induced were very similar.

On the other hand, a mosaic virus isolated by Yarwood from apple in Tulare county, California [**35**, p. 902], was transmitted mechanically, by dodder, and by budding to all the rosaceous hosts listed. This virus, for which the common name Tulare apple mosaic virus is proposed, is therefore regarded as new, although inducing symptoms in apple indistinguishable from those of apple mosaic virus. It also produced a chlorotic leaf mosaic in sunflower and *Tithonia speciosa*.

Miller (P. M.) & Waggoner (P. E.). **Dissemination of Venturia inaequalis ascospores.**—*Phytopathology*, **48**, 8, pp. 416–419, 4 graphs, 1958.

A more detailed account of observations already noticed [**36**, p. 596]. After the initial max. discharge, if rain continued over 10 hr., a 2nd peak occurred between 9 and 14 hr. Occasional light discharges (under 150/c.m.), usually lasting 1–3 hr. around noon, occurred in dry weather in May after nights with R.H. over 95%. It seems that the 1st appearance of ascospores generally coincides with a given stage of tree growth in the area concerned.

Cation (D.). **Comparison of fungicides for control of Apple scab at Paw Paw.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 603–608, 1958.

This is a progress report covering spraying trials in 1957 against scab [*Venturia inaequalis*: cf. **37**, p. 171] with 13 fungicides.

Trees unsprayed from pre-pink to petal fall soon developed 100% leaf and fruit infection which no amount of later spraying could correct. Good timing in relation to rainfall from pre-pink to 3rd cover prevented nearly all primary scab even with the weakest materials. Sepal infection (silver tip to green tip only) was responsible for all the mild infection and most of the medium and severe and almost all the fruit infection. The most effective treatments were, thus, the ones that controlled sepal scab. Cyprex [**37**, p. 540] at 1 or 1½ lb./100 gal. was markedly superior to all other materials, compared with the barely adequate control given by the standard materials.

Terui (M.) & Kagawa (H.). **The influence of trichomycin on the germination of the Apple blossom-blight fungus and the Apple pollen.**—*Bull. Fac. Agric. Hirosaki Univ.* 3, pp. 21–25, 1 graph, 1957. [Japanese. Abs. from English summary.]

Trichomycin [cf. **37**, p. 141] at 50 μg./ml. *in vitro* effectively inhibited the germination of macroconidia of *Sclerotinia* [*laxa* f.] *mali* and did not affect germination of pollen.

Sewell (G. W. F.) & Glasscock (H. H.). **Verticillium wilt of Apple.**—*Plant Path.*, **7**, 2, p. 76, 1958.

In the spring of 1955, 2- and 3-year-old branches of Cox's Orange Pippin apple trees near Canterbury were affected by the death of several blossom trusses and

sectorial discoloration of the wood. *Verticillium* was isolated and during 2 yr. in culture has produced only the black resting mycelium typical of *V. albo-atrum*. There appears to be only 1 previous record on apple [**11**, p. 745].

WOODHEAD (C. E.). **A survey of collar rot and root rot of Cox's Orange Pippin and other Apple varieties in Nelson and Marlborough.**—*N.Z.J. agric. Res.*, **1**, 4, pp. 462–476, 4 fig., 1958.

This is a more detailed account of information on *Phytophthora cactorum* on apple [**37**, pp. 47, 287]. Delicious was the most severely affected variety (7·9%) in the group over 40 yr. old.

[See also C. E. WOODHEAD, Collar rot and root rot of Apples in Nelson and Marlborough, *N.Z.J. Agric.*, **96**, 1, pp. 45, 47, 49, 51–52, 5 fig., 1958.]

MONTGOMERY (H. B. S.). **Effect of storage conditions on the incidence of Gloeosporium rots of Apple fruits.**—*Nature, Lond.*, **182**, 4637, pp. 737–738, 1958.

It was noted at East Malling Research Station in 1955–6, 1957–8, and, to a less marked degree, in 1956–7, that in certain samples of Cox's Orange Pippin apples from SE. England the percentage of fruits damaged by *Gloeosporium* spp. was lower after gas storage (39° F., 3% 0_2 and 5% CO_2) during $4\frac{1}{2}$ months than after cold storage at 37° for $3\frac{1}{2}$ months. With other samples, the converse occurred.

A preliminary examination of 17 samples after gas storage in 1957–8 indicated that the different behaviour might be due to difference in the predominating species of *Gloeosporium*. Sub-samples of up to 25 apples were accordingly taken from 4 samples with decreased and 4 with increased rotting in gas storage, each sample being taken from a different orchard. In the former the percentage of the total rotting due to *G. album* averaged 78·5, whereas in the latter the figure was only 8·7 (3 samples only) and in these rotting by *G.* [*Neofabraea*] *perennans* was higher. *G. album* generally grows more slowly in storage than *N. perennans* and this may perhaps make it more susceptible to the O_2 and CO_2 conc. reached some days after the gas storage-chamber is closed. Alternatively, the late development of *G. album* in storage may be associated with an advanced stage of maturity of the fruit, with the result that it is more likely to be affected by a treatment (such as gas storage) which delays maturity.

The results suggest that there are important differences in the biology and mode of parasitism of *G. album* and *N. perennans*.

FISHER (E. G.), WALKER (D. R.), BOYNTON (D.), & KWONG (S. S.). **Studies on the control of magnesium deficiency and its effects on Apple trees.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 1–10, 1958.

A soil application in 1954 to 2 mature orchards in New York State showed that 20% MgO limestone [cf. **37**, p. 360] produced a significantly higher leaf Mg than 12% in one orchard (heavier soil) in 1956 and in the other in 1955 and 1956. Disking the lime produced results after 3 years (increased pH and Mg availability) in the heavy soil only, while mulch increased only the leaf N. Application of Mg also produced higher yields and larger fruit in the orchard showing seasonal drop in leaf Mg, which could be most reliably estimated in leaf samples collected at harvest time.

WARD (J. K.). **Magnesium deficiency in Apples in the Huon Valley of Tasmania.**—*Tasm. J. Agric.*, **29**, 3, pp. 238–246, 1 col. pl., 2 fig., 1958.

It is noted that Mg deficiency in apples [**36**, p. 652 and above], the symptoms of which are illustrated, always follows high applications of K fertilizer. It can be corrected by 5–7 sprays with 2% Epsom salts, starting at the calyx stage, together with one or two $\frac{1}{2}$ ton/acre dressings of dolomite, and the omission of K from

fertilizers until the deficiency is corrected. This treatment may be modified when the deficiency is mild. Dolomite is recommended in Tasmania whenever lime is to be applied.

Okamoto (T.). **Studies on Apple scald. Part I. Production of scaldlike injury by various volatiles.**—*Bull. Fac. Agric. Hirosaki Univ.* 4, pp. 47–50, 1958. [Japanese. Abs. from English summary.]

Apple scald [cf. **37**, p. 588] was induced by aliphatic acids of low mol. wt., such as formic and acetic, n-amyl and n-hexyl alcohol, esters containing 6–8 carbons, n-capronaldehyde, &c.

Ridé (M.) & Sutic (D.). **Un dessèchement des pousses de Poirier d'origine bactérienne.** [A blight of Pear shoots of bacterial origin.]—*C. R. Acad. Agric. Fr.*, **44**, 7, pp. 384–387, 1958.

On 28 May 1957 some or all of the flowers or very young shoots on Passe-Crassane pear trees growing at the Experiment Station, Vernou, Sologne, France, turned black and dried, the process spreading gradually to the base of the inflorescences and the shoots. Isolations gave a bacterium apparently identical with *Pseudomonas syringae*, not previously recorded on pear in France.

Boyd (A. E. W.) & Paton (A. M.). **Trial of antibiotic paint for control of bacterial stem canker of Plum.**—*Plant Path.*, **7**, 3, pp. 88–91, 1958.

At the Edinburgh and E. of Scotland College of Agriculture an emulsion paint with a streptomycin potency of 10,000 i.u./ml., brushed on to stems of young Victoria plum trees on Myrobalan B stock in Jan. 1955, markedly reduced the incidence of stem canker (*Pseudomonas* [*mors-prunorum*: cf. **37**, p. 94 *et passim*]), which is particularly severe in young plantings in Scotland. Unwounded, untreated stems proved highly resistant to penetration even by high concs. of the pathogen. Most of the infections take place through abrasions developing where the tree has been tied to a stake. The paint formed a membrane over the bark surface, which showed little deterioration over 6 months and the antibiotic remained stable in it for a similar period.

Hansen (C. J.), Proebsting (E. L.), & Torpen (E.). **Boron requirements of Prunes.**—*Calif. Agric.*, **12**, 8, pp. 8, 13, 2 fig., 1958.

In Sonoma county, California, B deficiency (less than 25 p.p.m., dry weight) in French prune trees [cf. **21**, p. 26; **35**, p. 199] is indicated by die-back of terminal shoots, accompanied by the development of lateral buds to give a 'bushy branch' effect. Affected trees bloom normally but produce little fruit; this ripens prematurely, has brown, sunken areas, and sometimes gum pockets. In trials run by the University of California deficient trees responded to 2 sprays with 66% boron trioxide at 1 lb./100 gal. or 1 spray plus ½ lb. borax on the soil by considerably increased yields and reduction in deficiency symptoms. Diagnostic injections of B into the trunk also eliminated symptoms and improved yields. If no B is added to the soil sprays should be annual.

Osterwalder (A.). **Von einer häufigen, aber noch unbekannten Blattkrankheit der Hauszwetschge.** [On a common but as yet unknown leaf disease of the domestic Prune Plum.]—*Schweiz. Z. Obst-u. Weinb.*, **67**, 18, pp. 450–453, 3 fig., 1958.

The disease first appeared in late July as small, often numerous, reddish-brown leaf spots (½ mm.), growing to approx. 2 mm. before turning grey and drying to give a shot-hole effect. A *Sphaceloma* sp., provisionally named *S. pruni*, was the only fungus present, and was assumed to be responsible, though pathogenicity has not been demonstrated.

Jensen (D. D.). **Reduction in longevity of leafhoppers carrying Peach yellow leaf roll virus.**—Abs. in *Phytopathology*, **48**, 8, p. 394, 1958.

After completion of the 30 day virus incubation period in 60 nymphs of *Colladonus montanus* fed for 3–17 days on celery infected by peach yellow leaf roll virus [str. of peach western X disease: cf. **37**, p. 291] they were caged singly on healthy celery and transferred daily to new plants until they died; 39 transmitted virus. The percentage of insects infective in 7 experiments was proportional to the acquisition time, 27% becoming infective after 3 days and 90% after 16 days. The average longevity of the transmitting insects was 22 days (6–79), of the non-transmitters 55 (8–132). The virus may possibly be pathogenic to the vector as well as to the plant.

Jerome (Mrs. S. M. R.). **Brown rot of stone fruits. Latent contamination in relation to spread of the disease.**—*J. Aust. Inst. agric. Sci.*, **24**, 2, pp. 132–140, 1958.

At Canberra, Australia, infection of peaches by *Sclerotinia fructicola* [cf. **37**, p. 489 *et passim*] can occur rapidly in favourable natural conditions from conidia on the surface of the fruit. Viable conidia were found on the surface of peaches in numbers decreasing with the distance from the source of infection. With a heavy enough contamination, penetration will occur whatever the state of maturity of the fruit, though symptoms may take longer to appear in immature than in mature fruit. No inhibition of infection occurred in the sub-epidermal tissue of green fruits and soft ripe ones and any delay in the infection of whole green fruit as compared with whole mature fruit would appear to be due to the mechanical difficulties of penetration and the subsequent growth of the fungus. All of 3 lots of 20 very green peaches became infected when inoculated after being (*a*) bruised in a vice, (*b*) pricked with a sterile needle, and (*c*) uninjured, differences in degree appearing to depend on the increased probability in lot (*a*) of a spore becoming infective.

When fruit was harvested and divided into 3 lots which were (*a*) dropped from a height of 3 m. on to a hard surface, (*b*) similarly from 1·5 m., and (*c*) not treated, (*a*) developed 100% infection (86% in 4 days), (*b*) 78% infection (50% in 4 days), and (*c*) a moderately constant loss by infection, totalling 63% in 10 days, nearly all of it traceable to some small injury. It was also found that conidia deposited on fruit surfaces can remain viable for long periods under most conditions of temperature and humidity occurring in the Canberra area.

Ogawa (J. M.). **The influence of emanations from fruits of Prunus species on spore germination of the brown-rot organisms.**—Abs. in *Phytopathology*, **48**, 8, p. 396, 1958.

When green and ripe peaches were dusted with spores of *Sclerotinia fructicola* spore germination was less and germ tubes were shorter on the green. When spore suspensions were exposed to gaseous emanations from green peaches germination was decreased from 69 (untreated) to 15%, whereas ripe fruits of peach, apricot, and cherry stimulated germination of both *S. fructicola* and *S. laxa*, the max. being from 8 to 97%.

Daines (R. H.), Cohoon (D. F.), Leone (Ida), & Brennan (Eileen). **Control of Fusicoccum canker of Peach by nutrition, defoliation, and protective fungicides.** —*Phytopathology*, **48**, 8, pp. 400–407, 6 fig., 1958. [20 ref.]

At New Jersey Agricultural Experiment Station, New Brunswick, the opt. temp. for growth of *F. amygdali* [**37**, p. 543] on potato dextrose agar was 80–85° F. and for spore germination (50% in 7 hr.) about 80°; constant light, high sugar conc., and certain N sources all favoured growth. A high percentage of leaf scar infection developed from inoculations made from 25 June to 20 Nov., the max. when inoculation immediately followed artificial defoliation; with a lapse of 11 days cankers

were few, gum formation beginning at the scar surface within 4 days of abscission and periderm formation being complete within 7–10 days. In the greenhouse cankers appeared within 31 days at stem nodes bearing leaves wound inoculated at the base of the blade, but the persistence of such leaves in the orchard long enough to allow twig infection is uncertain. Penetration also occurred through bud scale scars; in a series of inoculations max. infection was correlated with those made during budscale fall. Bruised buds and fruit scars also acted as infection courts.

There was an increase in infection with increased N supply to trees in sand cultures. Standard fungicides applied during delayed dormancy and continued every 2 weeks until leaf fall reduced the cankers, which in the unsprayed ranged from 59–174/100 terminals in one block, and 141–293 in another, to 12–51 and 21–61, respectively, for the most effective treatments. Cyanamide sprays or dusts given to hasten defoliation in the autumn (other chemicals tried caused bark injury) shortened the period over which protective spraying was needed.

Klos (E. J.). **Bacterial spot of Peach and its control.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 653–658, 1 fig., 1958.

Following the failure of autumn spraying with 4:6:100 Bordeaux mixture, with or without sticker, to control *Xanthomonas pruni* on peach, 3 summer sprays with streptomycin (100 p.p.m.) were found to give good control of leaf infection in 1956 [cf. **36**, p. 770]; niacide Z–65 [ziram+Zn benzothiazylmercaptide] (3 lb./100 gal.; Niagara Chem. Div.) was equivalent in control to $ZnSO_4$+lime. Further work is needed on the timing of these sprays. Nu-Z (Tennessee Corp.) caused severe leaf injury in 1957.

Dye (M.H.). **Development of streptomycin-resistant variants of Pseudomonas syringae van Hall in culture and in Peach seedlings.**—*N.Z.J. agric. Res.* (formerly *N.Z.J. Sci. Tech.*, Sect. A.), **1**, 1, pp. 44–50, 1 graph, 1958.

After 6 transfers through broth cultures containing graded concs. of streptomycin, at the D.S.I.R., Auckland, a sensitive strain of *P. syringae* initially inhibited by 0·1–0·5 μg./ml. was able to grow in concs. up to 679 μg./ml. [cf. **36**, pp. 331, 534]. From peach seedlings sprayed with streptomycin and later inoculated with a sensitive strain 60 isolates were obtained, most of which required more than 50 μg./ml. to prevent growth in streak-plate assays: only 4 were pathogenic, but of these 1 was resistant to a conc. above 500 μg./ml. Resistance and pathogenicity were not reduced after repeated transfer on streptomycin-free media. It is not certain that the non-pathogenic isolates were *P. syringae*, though they had its general appearance.

Streptomycin spray at 100 and 500 μg./ml. did not reduce infection in seedlings inoculated with a strain resistant to the antibiotic at 340 μg./ml., but a combination of streptomycin with oxytetracycline (same concs. of total antibiotic) significantly reduced infection at both levels. This combination is thus preferable where a streptomycin resistant variant is present.

Ashour (W. A.) & Allam (M. E.). **Shot-hole disease of stone fruits in Egypt and its life history. I.—Studies on the symptoms and the causal organism. Experiments on the control of shot-hole disease of Peach trees in Egypt.**—*Ann. agric. Sci. Cairo*, **1**, 2, pp. 49–63, 8 fig., 1956; **2**, 1, pp. 23–33, 1 fig., 1957. [Arabic summaries.]

During investigations on shot-hole (*Clasterosporium carpophilum* [**33**, p. 361]) of stone fruits at the Ain Shams University, Egypt, experimental inoculation of peach, apricot, and almond produced black lesions, cankers, gumming, and defoliation (in severe cases) on various organs of the plants. The fungus hibernated in cankers and infected buds, causing swelling and epidermal rupturing during sporulation, followed by death of infected tissue.

Increasing conc. of lime-sulphur and Bordeaux mixture [**35**, p. 377] in Richards's medium decreased growth, sporulation, and germination, but in the field in 1953 Bordeaux appeared to increase the disease. The beneficial effect of dormant lime-sulphur in Jan. 1954 was correlated with higher temp. in Feb. and Mar. than in the 2 previous years, when neither lime-sulphur nor Bordeaux gave any control.

Blodgett (E. C.) & Twomey (J. A.). **Virus gummosis of Apricot.**—*Phytopathology*, **48**, 8, pp. 435–437, 4 fig., 1958.

A new virus affecting Royal and Tilton apricots in 3 orchards, but not Wenatchee in the original orchard, is reported from Irrigation Experiment Station, Prosser, Washington; it was first found in the Yakima Valley of Washington in 1947. It causes extensive gumming on branches and trunks, necrosis, bark roughening, a die-back of new shoots, a lace leaf appearance, and dead, soft areas in the fruit. It was transmitted by budding to Lovell peach, and Tilton, Henderson, and Wenatchee apricots, but not to certain other apricots or other *Prunus* spp.

Hull (J.) & Klos (E. J.). **Responses of healthy, ring spot-, and yellows virus-infected Montmorency Cherry trees to gibberellic acid.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **41**, 1, pp. 19–23, 2 graphs, 1958.

In a small-scale experiment spraying the foliage of Montmorency cherries with gibberellic acid (100 p.p.m.) promoted the growth of the shoots of both healthy trees and those infected by [peach] ring spot [virus] and cherry [sour] yellows virus. It may be possible thus to counter the stunting so commonly caused by the latter virus.

Cation (D.). **Comparison of fungicides for control of Cherry leaf spot in 1956 and 1957.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 609–619, 1958.

For the control of cherry leaf spot (*Coccomyces* [*Higginsia*] *hiemalis* [cf. **37**, p. 490]) under exacting conditions in 1956 and 1957 cyprex, at 1 or ½ lb./100 gal., 3 pre- and 1 post-harvest sprays, was superior to all other fungicides tested, though a combination of glyodin with ferbam (1½ pt.: ½ lb.) gave equal control in an average year. Fixed Cu-lime (3:3) controlled the disease but was phytotoxic. Omadine compounds gave control but were no better than presently available materials.

Klos (E. J.) & Rebmam (E.). **Cherry leaf spot control and physiological effects by new and standard fungicides.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 646–652, 1958.

Cyprex (1 lb./100 gal.) gave outstandingly good control of *Coccomyces* [*Higginsia*] *hiemalis* in 1 trial and protected the foliage from lead arsenate injury while having little effect on the total solids content of mature fruit. Phygon (1 lb.) and thylate (1½) both gave good control but lowered the total solids. Actidione (1 p.p.m.) did not protect against heavy infection late in the season, gave little protection against lead, and markedly lowered the total solids content. Captan (2 lb.), with little lead injury and highest total solids, failed to protect late in the season.

Fulton (R. H.). **Controlling mummy berry disease of Blueberries by soil treatment.** —*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 491–497, 1 fig., 1958.

A description of further work [cf. **32**, p. 87] in which prevention of apothecial formation of *Monilinia* [*Sclerotinia*] *vaccinii-corymbosi* on fallen fruits effectively controlled infection of the young shoots. Hand or machine cultivation was ineffective because many mummified berries remained lodged in the crowns of the bushes. Eradicant soil treatment with aero calcium cyanamide dust (special grade (57%) at 200 lb./acre), best carried out when the apothecia have partially emerged, gave better results than protective spraying of the foliage. The cyanamide was not

phytotoxic and did not render the soil alkaline: applications by aeroplane and by tractor-drawn equipment gave comparable results.

HARRISON (B. D.). **Cucumber mosaic virus in Raspberry.**—*Plant Path.*, **7**, 3, pp. 109–111, 1958.

Plants in a 4-year old planting of the New Zealand stock of Lloyd George raspberry, and in another field, both near Perth, Scotland, had large, light and dark green blotches on the leaves, though growth appeared to be unaffected. They were scattered irregularly through the plantation, suggesting that some were infected when planted, and the low incidence of the disease indicated a slow spread. A strain of cucumber mosaic virus [**37**, p. 697] was from its properties and aphid transmissibility (*Myzus persicae* and *Amphorophora rubi*) shown to be the cause of the condition. Raspberry appears to be a hitherto unrecorded host.

PRATT (M. J). **Occurrence, behaviour and control of Verticillium albo-atrum Reinke and Berth. in small fruits.**—*Diss. Abstr.*, **18**, 1, pp. 36–37, 1958.

Verticillium wilt, difficult to diagnose in the field, was recorded in Oregon in 1955 and 1956 as an important disease of black raspberry and strawberry, 24 of 70 plantings of the former and 10 of 21 of the latter being infected, but incidence in propagation stock was low. The fungus showed a low degree of host specificity; all isolates attacked black raspberries, most attacked Marshall strawberries, while few attacked Siletz strawberry and Washington red raspberry. Transplants of Black Beauty eggplants gave the most rapid and reliable index of soil infection, with a max. after 5 weeks in uniformly infected soil. The fungus could be eradicated [cf. **37**, p. 499] from the top 10 in. of soil in the field by 400 lb./acre of allyl bromide, chloropicrin, mylone, and vapam; 200 lb./acre was adequate in silt loam in the greenhouse under conditions favourable for the dispersion and activity of these chemicals.

MOULTON (J. E.), FULTON (R. H.), BELL (H. K.), & CARLSON (R. F.). **Comparison of virus-free stocks of Strawberries with standard commercial plants.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 568–574, 2 fig., 1958.

In field trials (1954–5) the yields from virus-free and virus-infected stocks of Robinson, Catskill, and Premier strawberries, the infected obtained from local nurseries [cf. **37**, p. 491], were at a max. only when the opt. number of runner plants became established early in the season.

The virus-free stocks of Robinson, tolerant of the viruses locally prevalent (predominantly latent C) were not superior; those of the susceptible Catskill were vigorous, giving rise to many runners early in the season, while the commercial stocks lacked vigour and were slow to produce runners. Results with Premier (tolerant) were inconclusive because the virus-free stock did not sufficiently resemble the local stock.

FULTON (R. H.) & LOVITT (D. F.). **The Michigan virus free Strawberry certification programme.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 575–580, 6 fig., 1958.

A description of the programme initiated at the Station in 1950 with the object of establishing virus-free foundation stocks of various strawberry vars. [**32**, p. 573] and granting certificates to nurseries propagating these stocks with suitable precautions. Altogether 7 virus-free vars. have been isolated and many others have been acquired from other States.

LISTER (R. M.). **Soil-borne virus diseases in Strawberry.**—*Plant Path.*, **7**, 3, pp. 92–94, 1 pl., 1958.

Some of the information from the Scottish Horticultural Research Institute,

Invergowrie, Dundee, on raspberry ring spot [raspberry Scottish leaf curl] virus has been noted [**37**, p. 697]. In the spring of 1957 a stock of Cambridge Favourite strawberry obtained from Devon was planted at Mylnefield. By June about 30% were very severely stunted and their leaves were twisted and deformed, with yellow blotches. They produced few runner plants, and the stolons were short, thick, brittle, and red. These symptoms were shown to be caused by raspberry yellow dwarf virus [cf. **37**, p. 669], which was also identified in the same stock in Angus in the spring of 1957. The distribution of the affected plants at both localities indicated that they had been affected but symptomless when planted. In Nov. 1957 Talisman plants on 2 farms in Lanarkshire, where it is suggested that the virus may be endemic, were also affected, well over 1,000 plants being involved on 1 farm.

Schöniger (G.). **Erdbeervirosen in Deutschland. III. Das Erdbeer-Nekrosevirus, ein weiteres nichtpersistentes Virus.** [Strawberry viroses in Germany. III. Strawberry necrosis virus, another non-persistent virus.]—*Phytopath. Z.*, **32**, 3, pp. 325–334, 5 fig., 1958. [English summary.]

The isolation at the Institut für Angewandte Botanik, University of Würzburg, Germany [cf. **35**, p. 904], of strawberry necrosis virus and its properties are described. Necrosis of veins and leaf petioles of *Fragaria vesca* (East Malling clone) is the most important symptom. The shortest infection feeding period by *Pentatrichopus fragaefolii* [**35**, p. 904] is 6 hr. Transmission occurs during the 1st hr. after leaving the infector, the vector remaining infective usually no longer than 4 hr. A temp. 4–5° C. lower than normal (14–22° night and 21–35° day) can delay the development of primary symptoms and a drop of 10° can suppress their development altogether. Short periods of high temp. (increase of 10°) cause only slight or non-permanent injuries. Prolonged high temp. produces more severe final symptoms.

Combination with different virus 1 strains [strawberry mottle virus] proved strawberry necrosis virus to be distinct. It is one of the components of the strawberry virus complexes 4 and 5 [loc. cit.]. Microscopic observations [see below] suggest the presence of a latent necrosis virus strain. Comparison of the necrosis virus with the English strawberry leaf curl virus showed that the primary symptoms and their occurrence are entirely similar. The later behaviour of plants infected by leaf curl is also in agreement, though leaf curl virus was weaker under corresponding temp., and its persistence in the vector is 2 hr. less than that of the necrosis virus. Certain strong virus strains arise by double infection of mottle plus latent necrosis virus.

Schöniger (G.). **Anatomische Veränderungen in den Blattstielen von Fragaria vesca L. als Folge der Infektion mit dem Erdbeernekrosevirus.** [Anatomical changes in the leaf stalks of *Fragaria vesca* L. as a sequel to infection with the Strawberry necrosis virus.]—*Naturwissenschaften*, **45**, 16, p. 397, 1 fig., 1958.

The microscopic examination at the Institut für Angewandte Botanik, University of Würzburg, Germany, of sections (stained with safranin and light green) of strawberry plants infected by strawberry necrosis virus [see above] revealed more or less extensive occlusion of the sieve-tubes, companion cells, and phloem parenchyma, with sometimes the collapse of the last two. The initial symptoms in the vascular bundles occur in the middle lamella; subsequently wood elements (which appear to be infected later), like those of the phloem, become more or less completely obstructed. From preliminary experiments a rubber-like substance seems to be responsible for the stoppage.

It is clear from these observations that metabolism is interrupted, leading to premature death of the leaves. The assimilation of the entire plant is defective, resulting in poor growth.

McGrew (J. R.). **Reactions of Fragaria vesca seedlings to a single Strawberry virus isolate.**—Abs. in *Phytopathology*, **48**, 8, pp. 462–463, 1958.

As all stocks of the East Malling indicator clone of *F. vesca* carry latent virus A [str. of strawberry latent virus: **37**, p. 174] and as there is no evidence that strawberry viruses are seed transmissible, 35 seedlings of the clone were raised and stolon-grafted to a source of latent virus C [str. of strawberry latent virus: **36**, p. 39]. Nineteen developed varying symptoms, the remaining symptomless 16 were grafted to East Malling clone plants which all developed type 2 symptoms [A+C]. Although virus A could have passed through the graft union into the seedlings these remained symptomless. It appears that expression of latent virus C depends on the susceptibility of a particular *F. vesca* seedling clone rather than on the presence of a conditioning virus such as latent A.

Fulton (R. H.). **Studies of Strawberry leaf spot in Michigan.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 3, pp. 581–588, 3 fig., 1958.

A description of the disease (*Mycosphaerella fragariae*) and its epidemiology, with reference to varietal resistance and control in Michigan [cf. **37**, p. 545]. Most of the local major vars. are resistant but newly introduced ones resistant to red-stele [*Phytophthora fragariae*] are quite susceptible. Cyprex (2lb./100 gal.) gave exceptional control in 1957, 100% infection being reduced to 4·35.

Sturgess (O. W.). **A ripe fruit rot of the Strawberry caused by a species of Gloeosporium.**—*Qd J. agric. Sci.*, **14**, 4, pp. 241–251, 3 fig., 1 graph, 1958.

A detailed account of the pathogen causing this disease has been noticed [**33**, p. 612]. The conidia of the *Gloeosporium* consistently isolated measured 12·9–13·9 × 3·2–3·9 μ. Another isolate occasionally encountered measured 7–8·8 × 2·3–3·8 μ. No specific name is assigned in the absence of a perfect state.

Thompson (B. D.). **Post-harvest chemical treatments for the control of Strawberry fruit rots.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 224–230, 1958.

Although post-harvest dips, at Gainesville, Florida [**37**, p. 97], of fruit in captan and dehydroacetic acid (0·5–1% for less than 5 min.) controlled rots due to *Botrytis cinerea*, *Rhizopus nigricans* [*R. stolonifer*], and an unidentified fungus, the treatment cannot be recommended because it is not approved of by the Food and Drug Administration.

Report on the Agricultural Department (Grenada) for the year 1956.—37 pp., 1958. $1·00 (B.W.I.).

In the report (pp. 29–31) by the Plant Protection Officer, D. K. Samuels [cf. **37**, p. 466], it is noted that successful control of banana leaf spot [*Mycosphaerella musicola*] was achieved by low-volume spraying with copper oxychloride, using orchard oil as a carrier, at 2 gal./acre on a 21-day cycle.

Price (D.). **The selection of oils for spraying against leaf spot disease of Banana.**—*Trop. Agriculture, Trin.*, **35**, 3, pp. 225–228, 1958.

In general, oils for spraying against leaf spot (*Mycosphaerella musicola*) are selected on a basis of unsulphonated residue (usually 80–90%), viscosity, and cost [cf. **37**, p. 448]. The method of retarding the growth of fungus cultures by flooding with liquid paraffin was used at the Research Division, Cameroons Development Corporation, to compare the action of oils; 2 hr.-old plate cultures of *Fusarium oxysporum* f. *cubense* were covered with 15 ml. of sterile liquid paraffin or 1 of 5 commercial paraffin-based spray oils of similar unsulphonated residue, recommended for leaf spot control; they were examined for fungal growth after 72 hr. incubation. The purely physical fungistatic effect of liquid paraffin was observed in all, but the

other oils exhibited in addition a greater or lesser effect attributable to the different chemical natures of their unsaturated fractions, which seems to be linked with toxicity for banana foliage and consequent loss in fruit weight, so that the method described permits a rapid assessment of phytotoxicity.

It is considered that oils would be suitable if they caused less than 10% retardation of fungal growth, compared with liquid paraffin, and have a low chemical activity, and hence low phytotoxicity. Selection of an oil will thus depend on weighing purity against cost, the profitability of the crop determining whether the purer, more expensive, oils can be used.

Leach (R.). **Annual Report of the Banana Board Research Department, Jamaica, 1956–1957.**—22 pp., 1958.

In a large-scale trial triton X–114 proved a useful wetter for use with Bordeaux mixture [cf. **37**, p. 7], and the value of confining the spray to the 3 youngest leaves in the control of *Mycosphaerella musicola* leaf spot was confirmed. The results of spraying were assessed on the 7th leaf of every 4th plant (total 20). As triton X–114 leaves a deposit clearly visible from the ground, spraying can easily be supervised.

Initial experiments with a spray mixture of 4·5 gal. Esso orchard oil, 1·1 gal. diesel oil, and 6·6 lb. copper oxychloride, at 2½ gal./acre, showed the Cu residue on the fruit to be negligible. Subsequent trials have already been noticed [**37**, p. 670]. Helicopter spraying, of which details are given, also proved satisfactory [cf. **37**, p. 730]. Oil spraying of bananas under coconuts had no ill effect on the latter.

The incidence of disease on fruit arriving in England was heavy and included (1) scarring; (2) soft stem end rot, spreading to the cushion of the hand, and thence to the finger stalks, causing finger drop (Wardlaw's 'main stalk rot' [cf. **14**, p. 322]); (3) Santa Marta stem end rot (cf. Wardlaw's 'finger stalk rot'), caused by bruise entry of *Gloeosporium musarum* and/or *Thielaviopsis* [*Ceratocystis*] *paradoxa*; and (4) anthracnose (cf. '*Gloeosporium* fruit rot'), a condition in which *Gloeosporium* infects the skin, developing noticeably towards the end of the voyage into a gradually spreading, black, sunken scar, on which the fungus sporulates. Slight abrasions are more conducive to anthracnose than severe bruising. The incidence of anthracnose was significantly correlated with that of Santa Marta stem end rot and scarring, all apparently being increased by rough handling.

Zentmyer (G. A.). **Resistance to Phytophthora cinnamomi in the genus Persea.**—Abs. in *Phytopathology*, **48**, 8, p. 399, 1958.

High resistance [**37**, p. 493] was found in the small-fruited *P. skutchii*, *P. caerulea*, *P. chrysophylla*, *P. donnell-smithii*, and *P. alba* collected in Central and S. America and the Caribbean, but these were not graft compatible with Californian avocado vars. Moderate resistance was found in Duke avocado and a West Indian type.

Wallihan (E. F.), Embleton (T. W.), & Printy (Wilma). **Zinc deficiency in the Avocado.**—*Calif. Agric.*, **12**, 6, pp. 4–5, 4 fig., 1958.

In tests at the University of California mild Zn deficiency in avocado [cf. **35**, p. 907] was corrected by applying zinc ethylene diamine tetra-acetate (NaZnEDTA) and zinc hydroxyethyl ethylene diamine triacetate (NaZnHEEDTA) to the soil at approx. 1 lb./tree; 4 lb./tree was not injurious. NaZnEDTA completely eliminated symptoms in 6-yr. old trees, in which the Zn content of the leaves rose from 15 to 50 p.p.m.

Zn deficiency produces foliage symptoms similar to those of excess chloride: they differ in that the former gives rise to a more uniform interveinal mottling while the latter produces more severe mottle at the leaf edges, and sometimes tipburn, even without mottling.

Malaguti (G.), Jiménez (H.), & Horovitz (S.). **Pruebas de transmisión del mosaico de la Lechosa a otras especies de Carica.** [Tests for the transmission of Papaw mosaic to different *Carica* spp.]—*Agron. trop., Maracay*, **7**, 1, pp. 23–31, 2 fig., 1957. [English summary.]

At the Agronomical Research Centre, Maracay, Venezuela, carborundum transmission tests of papaw mosaic virus [cf. **36**, p. 706 *et passim*] showed *C. cauliflora* and *C. candamarcensis* to be resistant, while *C. monoica* and *C. microcarpa* were susceptible. Symptoms in these spp. are described. The dilution end-point of the virus was about 1 : 1,000, the longevity *in vitro* not more than 22 hr.

Askew (H. O.), Monk (R. J.), & Watson (Joyce). **Molybdenum deficiency of the Hop.**—*N.Z.J. Agric. Res.*, **1**, 4, pp. 553–568, 4 fig., 1958.

A more detailed account of information already noticed [**36**, p. 275] and further work up to Feb. 1958. Sodium molybdate at 1 lb./acre effectively overcame the trouble; ground limestone at 1,800 lb./acre was slightly less effective.

Ynalvez (L. A.), Covar (R. R.), & Ocfemia (G. O.). **Chemical analyses of cadang-cadang-infected Coconuts, supposedly healthy palms from the cadang-cadang area and healthy trees from the College of Agriculture where the disease does not occur.**—*Philipp. Agric.*, **41**, 9, pp. 491–494, 1958.

In further studies of cadang-cadang disease of coconut [**37**, p. 549] probably caused by a virus, chemical analyses indicate that the Fe content is lower in infected plants, especially in the opened leaves, which have a higher P and K content than normal plants. There is little difference in B content in healthy and affected plants, and the Cu content was similar in both.

Nagaraj (A. N.) & Menon (K. P. V.). **Note on the etiology of the wilt (root) disease of Coconut Palms in Travancore-Cochin**—*Indian Cocon. J.*, **9**, 3, pp. 161–165, 1956. [Received 1958.]

Further work [**34**, p. 594] at the Central Coconut Research Station, Kayangulam, is reviewed in brief. Mechanical inoculations and insect transmission tests conducted under field conditions indicated that the disease may probably be caused by a sap-transmissible virus and that *Stephanitis typicus* may be a vector; 11 out of 19 plants caged with insects fed on diseased trees developed symptoms in 8–14 months, compared with 1 of 18 controls, and 17 of 31 sap inoculated compared with 3 of 30 not inoculated.

Bachy (A.) & Hoestra (H.). **Contribution à l'étude de la 'maladie de Kaïncopé' du Cocotier au Togo.** [A contribution to the study of 'Kaïncopé disease' of the Coconut Palm in Togoland.]—*Oléagineux*, **13**, 10, pp. 721–729, 6 fig., 1 graph, 1 map, 1958. [English summary.]

This disease [**30**, p. 414], known in Ghana as Cape Saint Paul wilt [bronze leaf wilt: **37**, p. 515], is spreading rapidly in the coastal areas of French Togoland [cf. **36**, p. 694]. A list of outbreaks shows that since 1954 the disease has spread all over the coconut-growing area, after remaining localized in the vicinity of Kaïncopé for over 20 years, and has destroyed about 2,500 acres (20% of the total). Statistical analysis of the data obtained on spread clearly demonstrated the contagious nature of the disease. Experiments have shown that it is not due to a soil deficiency.

Martin (H.). **Pests and diseases of Date Palm in Libya.**—*F.A.O. Pl. Prot. Bull.*, **6**, 8, pp. 120–123, 1958.

The distribution of *Graphiola phoenicis* and *Mauginiella scaettae* [cf. **35**, p. 605] on date palm in Libya is noted.

Rudorf (H.). **The significance of wild species for Potato breeding.**—*Europ. Potato J.*, **1**, 1, pp. 10–20, 5 fig., 3 graphs, 1958. [French and German summaries.]

This paper summarizes potato breeding work at the Max-Planck Institut, Köln-Vogelsang, Germany. Foliar and tuber resistance to *Phytophthora infestans* [**37**, p. 735] has been obtained in many hybrids with wild species. Resistance to *Alternaria solani* was demonstrated in hybrids with *Solanum demissum*, while resistance to *Streptomyces scabies* [**37**, p. 505] appears to be inherited by some spp. of the Sect. Commersoniana, especially *Solanum chacoense*. Many hybrids have resistance to one race or another of *Synchytrium endobioticum* [**37**, p. 502], but combined resistance to all races is rare. In certain lines of *Solanum acaule* standard reactions for resistance to virus X [**36**, p. 779] were found to correspond to those in *S. stoloniferum* for virus Y: allele Rx determines extreme resistance to all strains of virus X. The easily transferable resistance to the 3 mosaic viruses [potato viruses A, X, and Y] has been combined in some clones derived from *S. acaule*, *S. stoloniferum*, and potato. 'Infection resistance' to leaf-roll virus is of a polygenic nature [**35**, p. 265; **36**, p. 481], and has been improved along the lines of maize hybrids.

Jacobsen (B.). **The Potato breeding programme in Denmark.**—*Europ. Potato J.*, **1**, 1, pp. 21–24, 1958. [German and French summaries.]

One aim of the programme (at the Tylstrup and Vandel breeding stations) has been to secure incubation resistance to *Phytophthora infestans* [**36**, p. 514] in late vars., which are attacked to such a small extent that the yield is only slightly reduced. The nature of resistance to *Streptomyces scabies* [see above], which causes serious reduction in crops for home consumption and export, is the primary object of investigation at Vandel.

Broadbent (L.), Heathcote (G. D.), & Mason (E. Christine). **An Essex farm trial on the insecticidal control of Potato virus spread.**—*Plant Path.*, **7**, 2, pp. 53–55, 2 graphs, 1958.

This trial, details of which are given, confirmed results obtained at Rothamsted [**36**, p. 813; **37**, p. 28]. Both contact and systemic insecticides prevented the spread of potato leaf roll virus from infected plants within the crop, but had no effect on the spread of potato virus Y. The treatments failed to prevent the introduction of either virus by winged aphids during the summer. A good crop was, however, obtained for 3 successive years (1952–54), showing that it is not necessary to renew seed stock every year.

Harrison (B. D.). **Studies on the behaviour of Potato leaf roll and other viruses in the body of their aphid vector Myzus persicae (Sulz.).**—*Virology*, **6**, 1, pp. 265–277, 1 graph, 1958.

In experiments at the Scottish Horticultural Research Institute, Invergowrie, Dundee, aphids anaesthetized by CO_2 were rendered infective by injecting into the ventral side of the abdomen small volumes (0·01–0·05 μl.) of extracts of aphids which had acquired potato leaf roll [**37**, p. 698] and beet yellow net viruses by feeding on infective plants. Injections were performed under the microscope using a needle made from Pyrex 3–4 mm. tubing drawn out to a point (outer diam. 30–40 μ), attached to the barrel of an Agla micrometer syringe (Burroughs Wellcome Ltd.). Similar experiments with beet yellows virus were unsuccessful. Under opt. conditions 50% of the injected aphids transmitted potato leaf roll [cf. **35**, p. 388] for periods up to 18 days. They were seldom infective before 20 hr. after injection whereas aphids made infective by feeding on diseased plants, when injected with extracts of non-infective aphids, transmitted the virus during the following 20 hr. as often as did uninjected infective insects. The infectivity of the aphid extracts

increased with the time of the acquisition feeding. When insects fed 1–2 days on potato infected by leaf roll were transferred to turnip their virus content decreased with time. It is concluded that potato leaf roll virus passes into the blood of *M. persicae* before transmission, and that it does not multiply in this vector.

Williams (W. L.). **Experiments on the transmission of Potato leaf roll virus.**—*Diss. Abstr.*, **27**, 12, pp. 2784–2785, 1957.

In studies at Cornell University the chance of transmission of potato leaf roll virus [**37**, p. 109] (the best source being *Datura stramonium* plants 30 days after infection) by a single aphid (*Myzus persicae*) to *Physalis angulata* decreased as the number of aphids feeding on one plant was increased; the susceptibility of *P. angulata* seedlings was decreased by feeding nonviruliferous aphids on them. Transmission from *P. floridana*, *D. stramonium*, or *P. angulata* to *P. floridana* occurred within 1 hr. (acquisition and test feeding ½ hr. each); using aphids reared on infected *D. stramonium* reduced the transmission time to *D. stramonium* and *P. floridana* to 10 and 3 min., respectively. As acquisition feed time increased, the test feed time necessary for transmission from and to *D. stramonium* decreased, reaching 12 hr. with a 17 hr. acquisition period.

The virus was more readily acquired by the aphids from *P. floridana*, which also needed a smaller dose of virus than *D. stramonium*. The varied ability of individual aphids to transmit was hereditary.

Effective transmission was also obtained through dodder (*Cuscuta subinclusa*), especially when the test plant was shaded and the dodder pruned during contact: *C. campestris* failed to transmit. Of 16 solanaceous spp. tested, the following were insusceptible under the experimental conditions: *Nicotiana forgetiana*, *N. glauca*, *N. longiflora*, *N. sanderae*, *N. sylvestris*, *N. trigonophylla*, *Solanum elaeagnifolium*, eggplant, *S. vernei*, and *S. xanti*. Infected *N. physaloides* was also a good source of virus.

Meier (W.). **Der Einfluß der Höhenlage und geländeklimatischer Faktoren auf das Auftreten der grünen Pfirsichblattlaus (Myzus persicae Sulzer) in Kartoffelfeldern der Schweiz.** [The influence of altitude and local climatic factors on the occurrence of the green peach aphid (*M. persicae* Sulzer) in Swiss Potato fields.]—*Europ. Potato J.*, **1**, 2, pp. 25–46, 2 fig., 2 diag., 1958. [English and French summaries.]

Studies at many stations on the occurrence and migration of aphids [**33**, p. 551] in 1955–57 in relation to virus diseases of potatoes (leaf roll, virus Y, and mosaic [viruses X and A]) indicate a retardation of infection and a decrease in aphid numbers with increasing altitude. Hills exposed to winds and prealpine slopes offer the most favourable conditions for seed potato production.

Beemster (A. B. R.). **Transport van X-virus in de Aardappel (Solanum tuberosum L.) bij primaire infectie.** [Translocation of X-virus in the Potato (*S. tuberosum* L.) in primary infections.]—*Tijdschr. PlZiekt.*, **64**, 3, pp. 165–262, 1 diag., 9 graphs, 1958. [English summary pp. 237–245. 55 ref.]

This detailed study of the rate of translocation of potato virus X from the foliage to the tubers was undertaken at the Institut voor Plantenziektenkundig Onderzoek, Wageningen [cf. **34**, p. 79], to provide a basis for deciding the correct time to lift seed potatoes when infection is known to have occurred.

No precise conclusions could be arrived at because it was not possible to establish when the virus entered the stem after the first stage of multiplication in the leaf: it appeared, however, to be translocated in low concs. and probably discontinuously, rendering detection difficult. Within the stems it seemed to pass via the phloem, both up and down in young plants, but often downwards only in older ones. In

young plants passage from apical leaves was much more rapid than from basal. When plants of the var. Bintje were inoculated at different stages of development mature plant resistance was evidenced by the lower tuber infection in the older plants. This resistance, which commences with tuber formation, was not complete, and some virus reached the tubers from the 3–5th week even in plants inoculated late in the season. Inspection of 381 partially infected tubers revealed a tendency for the virus to accumulate at the apex.

Po (T.). **The effect of environmental factors on the concentration of X-virus in the Potato sprouts during their germination.**—*Acta phytopath. sinica*, **4**, 1, pp. 71–80, 1 fig., 1 graph, 1958. [Chinese. Abs. from English summary.]

Max. conc. of potato virus X in Irish Cobbler potato (determined by means of the serological precipitin test and lesion counts on *Gomphrena globosa*) occurred in sprouts germinated at 20° C. [cf. **33**, p. 441] (max. titre 1 : 320, av. half-leaf lesion number 30); lowering the germination temp. to 16° or raising it to 24° reduced the conc. markedly (more so at 28°), while germination in darkness increased it 4 times [cf. **35**, p. 215] over that in light. Aeration during germination with 21, 10, or 5% oxygen had no effect on virus conc.

Bagnall (R. H.), Wetter (C.), & Larson (R. H.). **The serological relationships of Potato viruses S and M, and the Carnation latent virus.**—Abs. in *Phytopathology*, **48**, 8, p. 391, 1958.

Potato viruses S [**36**, p. 419] and M [**36**, p. 779] have a small antigenic fraction in common and each has a separate fraction in common with carnation latent virus [cf. **37**, p. 631]; each of the 3 has a major antigenic fraction distinct from the others. S and M differ significantly in host range, symptomatology, and physical properties, and have no host in common with carnation latent virus. It is suggested, therefore, that the 3 may have a common ancestry but should be classified as separate species or subspecies rather than as strains.

Oswald (J. W.) & Bowman (T.). **Studies on a soil-borne Potato virus disease in California.**—Abs. in *Phytopathology*, **48**, 8, p. 396, 1958.

Kennebec potato tubers in the Salinas valley bore shallow necrotic rings (5–10 mm. diam.) just below the skin and internal necrotic flecks. Sap inoculation from the rings induced a necrotic mottle, severe stem necrosis, and stunting in Turkish and Burley tobacco. Of 142 tobacco plants grown in soil from diseased areas 17 developed similar symptoms, and 56% of diseased tubers gave at least 1 distorted plant with yellow mottle and stem necrosis. Only 14% of the total stems were affected but 44% of the tubers from diseased plants developed symptoms. Straight virus-like rods with modal lengths of 106 and $195 \times 20 m\mu$ were always associated with the disease and the virus was related serologically to tobacco rattle [str. of potato stem mottle] virus [cf. **37**, pp. 245, 501].

Wallin (J. R.) & Riley (J. A.). **The prediction of widespread late blight weather from synoptic pressure patterns.**—Abs. in *Phytopathology*, **48**, 8, p. 399, 1958.

Spread of *Phytophthora infestans* on potato and tomato in the N. Central States of the U.S.A. was predictable for a 7-day period (as determined by recording hygrothermographs) if coexistent time-temp.-R.H. values were: mean temp. 60–80° F. for 10 hr. or more, 54–59° for 13 hr. or more, or 45–53° for 16 hr. or more, all with R.H. 90%. The incidence of such periods was closely related to the existence of a nearly stationery E.-W. front just S. of the area, accompanied by an open wave or an active low pressure system. Air flow patterns obtained from 5-day mean-sea-level and 700-millibar pressure maps [cf. **37**, p. 553] showed the circulation pattern most indicative of periods favouring blight to be a S.E. flow at the surface coincident

with a S.W. flow at 10,000 ft. On this basis 5-day forecasts concerning blight weather were mostly successful.

Försund (E.) & Flaatten (H. K.). **Experiments of forecasting late blight epiphytotics in Norway.**—*Europ. Potato J.*, **1**, 2, pp. 5–13, 3 maps, 1958. [German and French summaries.]

The efficiency of a method of forecasting outbreaks of blight (*Phytophthora infestans*) [**37**, p. 553] suggested in 1956, if applied from 1952–54 would have been 75% correct, compared with 68% for Beaumont's rules. The intensity of epiphytotics depended on the number of favourable periods during growth and the length of the intervals between them, 5–7 days being opt. The conditions favouring a blight outbreak were R.H. above 75% for 48 hr. or more, at least 15 mm. rain in the previous 5-day period, min. temp. not below 10° C. in the 48 hr., or a mean of 14° or more in the 5 days. In general, however, the warnings were issued too late. Consequently, conditions were studied to ascertain the type of weather that might lead to the above conditions. Four such situations were found to be contributory, namely fog, humid air from the W., warm humid sectors, and quasi-stationary depressions to the S.W. Using the new method, an 89% efficacy was obtained in 1956, with no false warnings.

Björling (K.). **Biological and technical notes on spraying against Potato blight.**—*Europ. Potato J.*, **1**, 2, pp. 1–4, 1958. [German and French summaries.]

This information from Sweden on control of *Phytophthora infestans* has been noticed [**37**, p. 675].

Andrén (F.) & Olofsson (B.). **Besprutningsförsök mot Potatisbladmögel 1957.** [Spraying tests against Potato blight 1957.]—*Växtskyddsnotiser, Stockh.*, **22**, 3, pp. 49–52, 1958.

A tabulated survey is given of the results of tests with 16 preparations against potato blight [*Phytophthora infestans*] at the Swedish Plant Protection Institute, Bergshamra, where it was particularly severe, and at the Åkarp branch in Scania, using var. Up-to-Date in both series [cf. **36**, p. 781]. At Bergshamra the most effective protection was given by manzate and zineb Bayer and De Zäta 78 (both containing ethylene thiurammonosulphide), all at 2·5 kg./ha. Tuber rot was best controlled by M.C.O. (a mixture of Cu and Hg) at 6 kg./ha., followed by Cu alone.

The increases in gross yields due to spraying averaged 12% in the 2 series. The net increase at Bergshamra was estimated at 8 and at Åkarp 6.

The paper concludes with a brief discussion of the relative merits of the various fungicides used in the tests.

Andrén (F.) & Olofsson (B.). **Försök rörande förebyggande besprutning mot Potatisbladmögel 1957.** [Experiments relating to preventive spraying against Potato blight 1957.]—*Växtskyddsnotiser, Stockh.*, **22**, 3, pp. 34–38, 1958.

In tests in various localities of central and southern Sweden somewhat better protection against both blight and tuber rot [*Phytophthora infestans*] on several potato vars., including King Edward, Magnum Bonum, and Bintje, was conferred by Cu-containing compounds than by zineb [see above]. The highest net yield came from plots sprayed with a combination of both types (outweighing the untreated by 28% and each singly by 3–4). Three applications were generally insufficient, the difference between 3 and 4 being statistically assured in respect of blight.

Wang (T.-P.) & Hwang (H.). **Experiments on the control of Potato late blight by organic mercurial dusts.**—*Acta phytopath. sinica*, **4**, 1, pp. 81–86, 3 graphs, 1958. [Chinese. Abs. from English summary.]

At the Salingtze Agricultural Experiment Station, Hopeh, a remarkable increase

in potato yields and efficient control of *Phytophthora infestans* [**37**, p. 53] was obtained by dusting with a mixture of 1 part 2% ethyl mercuric chloride or 2·58% phenyl mercuric acetate and 9 parts hydrated lime 5 times at weekly intervals soon after the first appearance of the disease. Talc powder was inferior to hydrated lime as a diluent; neither the Ca ion nor the hydroxyl ion influenced the toxicity of the mercurials to sporangia in the laboratory, the LD 50 values of which were 0·02 and 0·058 p.p.m., respectively, compared with 0·15 for $CuSO_4$.

Driver (C. M.). **Races of Potato blight, Phytophthora infestans (Mont.) de Bary, in New Zealand.**—*N.Z.J. agric. Res.*, **1**, 4, pp. 527–530, 1958.

Some of the results of a survey carried out in 1956–57 have already been noticed [**37**, p. 303]. Additional races detected were 2, 3, and 4; race 0 is the commonest, then 4, also present throughout the country.

Quevedo Díaz (A.). **Nuevas razas fisiológicas del Phytophthora infestans en el país, pruebas de resistencia en variedades, híbridos y seedlings, y comprobación de ella en condiciones de campo.** [New physiologic races of *Phytophthora infestans* in the country, resistance tests of varieties, hybrids, and seedlings, and verification of this in the field.]—*Bol. Estac. exp. agríc., La Molina*, 70, 43 pp., 17 fig., 1958. [English summary. Mimeographed.]

Eight races of *P. infestans* were identified in 1957–58 as new to Peru [cf. **32**, p. 501], namely races 2; 1,2; 1,3; 2,3; 1,2,3; 1,2,4; 1,3,4; and 1,2,3,4. *Solanum demissum* and *S. antipoviczii* and a number of seedlings showed promise as valuable sources of resistance.

Takase (N.). **Studies on the resistance to late blight in Potatoes. IV. Genes controlling resistance to Phytophthora infestans and their phenotypic differences.** —*Jap. J. Breed.*, **7**, 1, pp. 17–23, 1 fig., 1 graph, 1957. [Japanese. Abs. from English summary. Received Aug. 1958.]

In this further contribution from the Hokkaido National Agricultural Experiment Station [cf. **37**, p. 370] a number of tubers from *Solanum demissum*×*S. tuberosum*, inoculated with races 0, 1, and 4 of *P. infestans*, produced 5 types of necrotic reaction. It was found that all the hybrids bred in Japan before 1956 possessed, singly or in combination, the resistance genes R_1 and R_4, the latter having a weaker phenotypic expression. The expression of both genes is apparently subject to a set of modifiers present in both parents.

Grechushnikov (A. I.) & Popkova (Mme K. V.). Снижение устойчивости к **Phytophthora infestans** о кольцованных листьев фитофтороустойчивых сортов Картофеля. [Reduced resistance to *P. infestans* of ringed leaves of *Phytophthora*-resistant Potato varieties.]—*Bull. Acad. Sci. U.S.S.R.*, Ser. biol., *1958*, 4, pp. 456–462, 1958. [English summary.]

At the Research Institute of Potato Economy, Korenevo, Moscow district, in 1956, tests on the potato vars. Seyanets 78, Lorh, Berlihingen, and Moscow showed that *P. infestans* [**37**, p. 592] grew better on detached leaves, which had, 5 days previously and before removal, had their petioles flamed. By this method the fungus could be induced to grow and sporulate even on the leaves of resistant vars., because of the reduced activity of peroxidase and an appreciable increase in soluble nutrients.

Wenzl (H.). **Beitrag zur Kenntnis der ökologischen Bedingungen des Auftretens von Kartoffelkrebs, Synchytrium endobioticum (Schilb.) Perc.** [Contribution to the knowledge of the ecological conditions determining the occurrence of Potato wart, *S. endobioticum* (Schilb.) Perc.]—*PflSchBer.*, **21**, 1–2, pp. 1–11, 4 maps, 1958. [English summary.]

A study of the meteorological data for 234 localities in Austria where wart [cf.

37, p. 304] has been recorded since 1925 indicated that it seldom occurs where the rainfall is less than 700 mm./yr., the mean annual temp. above 8° C., or the mean temp. for July above 18°. Most affected soils were acid. In general, conditions favourable for the disease occur in Central Europe only at altitudes above 400 m.

Salt (G. A.). **Oospora pustulans as a parasite of Potato roots.**—Abs. in *Trans. Brit. mycol. Soc.*, **41**, 3, p. 392, 1958.

This paper, presented at the Society's meeting in London, Jan. 1958, deals with the incidence of 'eye' infection by *O. pustulans* [**36**, p. 814; **37**, p. 632] on vars. such as Ulster Torch, even in the absence of visible pustules. In Majestic 65–80% infected tubers were detected by 'eye' tests compared with 0–30% rating by lesions. Sporulation of the fungus on root lesions on tomato seedlings after 8–10 weeks aids identification of its existence in the soil, where it may be less common than generally believed.

Van Emden (J. H.) & Labruyère (R. E.). **Results of some experiments on the control of common scab of Potatoes by chemical treatment of the soil.**—*Europ. Potato J.*, **1**, 2, pp. 14–24, 1958. [German and French summaries.]

In tests from 1955–57 soil treatment with PCNB (60–100 kg./ha.) shortly before planting and before earthing-up lowered the incidence of common scab [*Streptomyces scabies*: **37**, p. 556] on highly susceptible vars. at the Instituut voor Plantenziektenkundig, Wageningen, Netherlands (yields var. Eigenheimer, 897 g./plant, control 831, and var. Noordeling 601 against 573). The residual effect lasted into the 2nd year; it retarded early development, but also controlled *Rhizoctonia* [*Corticium*] *solani* [**37**, p. 504]. Mercuric chloride (16 kg./ha) was efficient as a solution but not as a powder (corresponding figures: 873–831, and 590–573). S (200 kg./ha.) had no fungicidal effect, but reduced scab by lowering soil pH; it was inefficient if the crop was grown in 3 consecutive years (corresponding figures: 677–657, 603–573).

Bartz (J. F.) & Berger (K. C.). **Urea formaldehyde concentrate-85, a promising control for Potato scab.**—*J. agric. Fd Chem.*, **6**, 9, pp. 675–677, 1958.

At the State Certified Seed Potato Farm, Three Lakes, Wisconsin, in an area infested with *Streptomyces scabies*, effective control of scab was obtained by the broadcast application of UF 85 at 150 gal./acre, using var. Irish Cobbler in 1956 and Chippewa in 1957. Treatments including fertilizer levels and PCNB [**34**, p. 395] were also compared. Stands were reduced by 42% when potatoes were planted immediately after broadcasting UF 85 at 250 gal. but were not affected by 150 (scab index reduction from 14·5 to 0·8 in 1956 and from 22 to 1·5 in 1957). The incidence of infection in plots treated with PCNB (50 gal.) was higher than in those receiving UF 85.

Nikitina (Mme E. T.). Миколитические бактерии и возможность использования их в борьбе с фузариозным увяданием Картофеля. [Mycolytic bacteria and the possibility of their use for the control of fusariosis wilt of Potatoes.]—Труд. Инст. Микробиол. Вирусол., АН Казак ССР [*Trud. Inst. Microbiol. Virol., Acad. Sci. Kazakh. S.S.R.*], **2**, pp. 24–41, 1958.

At the Botanical Garden, Kazakh Academy of Science, Alma-Ata, U.S.S.R., 108 soil samples were examined for mycolytic bacteria [cf. **29**, p. 501] active against *Fusarium oxysporum* [**37**, p. 504]. The most active strains were obtained from the rhizospheres of lucerne and clover. Lysis of the fungus in the soil was favoured by high R.H. (80–100%) and high temp. (30–37° [C.]).

In laboratory and field tests *Pseudomonas mycophaga*, the most active of 18 mycolytic strains, was not pathogenic to potatoes and had no effect on beneficial

soil micro-organisms. Introduced into the soil with *F. oxysporum* it reduced potato wilt to a tenth of that in plots inoculated only with the fungus. In the rhizosphere of 3-yr.-old lucerne it practically eradicated *F. oxysporum*, but had no effect with onion, wheat, cabbage, potato, or cucumber.

The lytic properties of the bacteria were best preserved in cultures with the lysed fungi.

Conroy (R. J.). **Powdery dry rot of Potato.**—*Agric. Gaz. N.S.W.*, **69**, 6, pp. 299–302, 1 fig., 1958.

In trials at Hawkesbury Agricultural College in 1957 potato seed tubers unaffected by *Fusarium trichothecioides* [**34**, p. 285] gave an average emergence of 92% and yield/emerged plant of 1·3 lb., or (calculated) 7·44 tons/acre. The figures for slightly infected tubers were 72% (27·8% of the emerged plants became affected by blackleg (*Bacterium carotovorum*) [*Erwinia carotovora*: **34**, p. 434]), 0·96 lb., and 4·29 tons/acre; and for moderately to heavily infested seed 39·2% (34·6% affected by blackleg), 0·57 lb., and 1·59 tons/acre. The var. Sebago proved more prone to powdery dry rot than others, and is also more susceptible to blackleg. It is probable that greater loss would have been experienced had the temp. been lower and the rainfall higher. Attention to adequate maturation of the tubers, avoidance of tuber injuries, and storage at 60–70° F. are recommended.

Von Gregory (Ruth M.) & Wartenberg (H.). **Untersuchungen über den Parasitmus von Erwinia phytophthora (Appel) Holland.** [Studies on the parasitism of *E. phytophthora* (Appel) Holland.]—*Phytopath. Z.*, **32**, 3, pp. 257–282, 2 graphs, 1958. [50 ref.]

At the Institut für Allgemeine Botanik, Friedrich Schiller University, Jena, the enzymatic activity of *E. phytophthora*, the agent of potato blackleg [**34**, p. 479], is restricted during the growing phase to the bacterium, but when autolysis sets in a weak pectolytic action is demonstrable in cell-free culture filtrates. *E. phytophthora* does not produce a diffusible wilt toxin having an irreversible action. The wilt of potato and tomato shoots in wilt tests in culture solutions was a reversible, water shortage wilt, attributable to the hydrolysis products of the pectin, which together with the bacteria hinder water movement in the vessels. No wilt occurred if no pectolytic enzymes were released in the cultures through autolysis. The culture solution had no pectolytic action if the bacteria were killed by heating. The bacteria macerate the stem tissues; in culture the released cells at first remain turgescent and can be kept alive, but in the field, the cells of the macerated tissues die, a condition observed in blackleg. This contradiction points to an unsolved problem. It is still unknown whether *E. phytophthora* itself can attack the cells of macerated tissues or what causes the death of the cells. The authors state that the 'tip roll' which occurs in foot and root diseases of potato cannot be a remote toxic effect of *Erwinia* infection. They suspect that it is a toxic action of *Colletotrichum atramentarium* demonstrable in all potato plants, to which they are predisposed by *Erwinia*.

Oruinbaev (S.). О наличии кольцевой гнили Картофеля в пригородных зонах г. Алма-Аты. [The presence of ring rot of Potatoes in the suburbs of Alma-Ata.]—Труд. Инст. Микробиол. Вирусол., АН Казак ССР [*Trud. Inst. Microbiol. Virol., Acad. Sci. Kazakh S.S.R.*], **2**, pp. 42–50, 1958.

At the Alma-Ata Agricultural Institute 2 strains of *Bacterium* [*Corynebacterium*] *sepedonicum* [**37**, p. 550] were isolated from potato, a virulent, 46, which retained its virulence in unsterilized soil for only a few days, but in sterile soil for 2–4 months, and a weaker, 51. Var. Lorh appears the most resistant to ring rot in the field.

Oruinbaev (S.). Актиномицеты-антагонисты возбудителя кольцевой гнили Картофеля. [Actinomycetes antagonistic to the causal agent of ring rot of Potatoes.]—Труд. Инст. Микробиол. Вирусол., АН Казак ССР [*Trud. Inst. Microbiol. Virol., Acad. Sci., Kazakh S.S.R.*], **2**, pp. 51–60, 1958.

At the Alma-Ata Agricultural Institute the richest sources of actinomycetes antagonistic to *Bacterium* [*Corynebacterium*] *sepedonicum* [see above] were found to be the rhizospheres of lucerne and orchard grass [*Dactylis* sp.] and the poorest those of potato, onion, and wheat. Treatment of potato tubers with actinomycete strain 85 before planting increased germination, plant height, and yield (by 5–29%), and reduced ring rot by 2–8%.

Oswald (J. W.), Lorenz (O. A.), Bowman (T.), Snyder (M.), & Hall (H.). **Potato fertilization and internal black spot in Santa Maria Valley.**—*Calif. Agric.*, **12**, 6, pp. 8, 10, 2 fig., 1 graph, 1958.

In field trials with Netted Gem potato at the University of California N and P levels were without effect on the occurrence or development of internal black spot after artificial bruising. The condition, which grew more severe the more the tubers were handled, and did not occur unless they were handled, was associated with K deficiency [cf. **37**, p. 108], but K applications up to 600 lb./acre did not achieve satisfactory control.

Hildebrand (E. M.). **Two syndromes caused by Sweet Potato viruses.**—*Science*, **128**, 3317, pp. 203–204, 2 fig., 1958.

Further studies by the Crops Research Division, Beltsville, Maryland, showed that there is a definite but limited amount of natural transmission of the sweet potato feathery mottle virus [**37**, p. 505] in the field, but it is usually revealed only after harvest, in the sprout growth of the bedded, infected roots. The 1957 season was unusual because it stimulated an extended vegetative growth throughout September, after a halt in growth during a drought in Aug., and there was positive evidence of current season transmission. When the 'flush of growth' technique [**36**, p. 786] was used in the greenhouse with material harvested from the field, a much higher incidence of infection than is found normally was detected.

During a survey in 1955–57, made in about 20 States, the syndromes of both feathery mottle and internal cork virus [**37**, p. 677] were encountered side by side in the field in 3 States: in Georgia in 1955 on Porto Rico, and in 1957 on Red Velvet in California and on Georgia Red in New Jersey. In other States the 'yellow dwarf' symptom, of common use in California, was found to be generally applicable for diagnosis. Sweet potato root material from Israel exhibited both the cork and feathery mottle syndromes and when indexed proved to be apparently identical with the United States material. Some aspects of the feathery mottle syndrome are similar to those of virus B in E. Africa [**37**, p. 110]. An insect vector for the American feathery mottle counterpart is postulated.

Hildebrand (E. M.). **Natural transmission of Sweet Potato feathery mottle virus.** —Abs. in *Phytopathology*, **48**, 8, p. 462, 1958.

Use of Porto Rico sweet potato as an indicator at Beltsville showed 8 and 6% natural transmission of the virus [cf. above] in 1955 and 1956 and 23·5 in 1957. Clone XXI of Porto Rico, highly susceptible to feathery mottle and highly resistant to [sweet potato] internal cork virus, is useful in separating syndromes resulting from dual infection.

Martin (W. J.). **Reaction of Sweet Potato varieties and seedlings to soil rot.**—*Phytopathology*, **48**, 8, pp. 445–448, 1 fig., 1958.

The reaction of sweet potato vars. to *Streptomyces ipomoeae* [**26**, p. 142; **34**, p. 103]

in heavily infected field plots at Louisiana Agricultural Experiment Station, Baton Rouge, varied from marked susceptibility in Unit 1 Porto Rico, the main Louisiana var., to a degree of tolerance in such vars. as Heartogold and Acadian, and considerable resistance in certain selected seedlings and introductions.

Control of pink disease.—*R.R.I. Plant. Bull.*, **37**, pp. 87–90, 1 fig., 1958.

The importance of clonal susceptibility to pink disease of *Hevea* rubber [*Corticium salmonicolor*] has been demonstrated repeatedly at the Experiment Station, Rubber Research Institute, Malaya. As the disease is seasonal, treatment [**37**, p. 677] is not required throughout the year. Affected trees can be treated entirely from the ground with a high-pressure sprayer with a 10 ft. lance and fine jet spraying up to 30 ft. Infected branches above this height may be ignored. Infections extending down the tree can be treated with stirrup-pumps. A straight jet is obtained by fitting a nozzle holding a steel or porcelain disk with a hole $\frac{3}{64}$ in. diam. in the centre.

The fungicides recommended are Bordeaux or other proprietary coppers, fylomac 90 at 0·5% (8 oz./10 gal.), or one of the tar acid fungicides used against mouldy rot [*Ceratocystis fimbriata*: **36**, pp. 124, 209]. Cu preparations should be used only before tapping, any contamination of the latex leading to deterioration of the rubber. Fylomac 90 and the tar acids may be used during tapping, but both scorch the leaves. Incorporation of a dye makes it easy to see where the treatment has been applied.

Dusting machinery for estate use.—*R.R.I. Plant. Bull.*, **37**, pp. 82–87, 6 fig., 1958.

Popular notes are given on various types of dusting machines used for the application of fungicides to *Hevea* rubber in Malaya.

Pathology section.—*Proc. 9th Congr. int. Soc. Sug. Cane Tech., India, 1956*, **1**, pp. 973–1205, 59 fig., 1 diag., 4 graphs, 1956. [Received Oct. 1958.]

In the opening address to this conference [cf. **35**, p. 633] the chairman, B. L. Chona, discussed sugarcane diseases in India generally (pp. 975–986). P. E. Robinson and J. P. Martin (pp. 986–1011) reported on the methods employed in testing sugarcane vars. against Fiji virus disease [**37**, p. 180] and downy mildew (*Sclerospora sacchari*) [**34**, p. 675] in Fiji, including an historical account and description of each disease. C. G. Hughes and D. R. L. Steindl noted (pp. 1012–1022) further developments in the study of ratoon stunting virus disease in Queensland [**36**, p. 352 *et passim*]. H. L. Hong discussed (pp. 1023–1029) the results of resistance trials against *Fusarium* 'pokkahboeng' [*Gibberella fujikuroi*: **27**, p. 256] in Java with P.O.J. 2878 and P.O.J. 3016, the former being more susceptible. A most valuable summary of the resistance of sugarcane vars. to the major diseases in different countries was presented in tabulated form [cf. **36**, p. 275; **37**, p. 594] by J. P. Martin & C. A. Wismer (pp. 1030–1041). The occurrence of a disease similar to red stripe [*Xanthomonas rubrilineans*] on sugarcane and certain grasses in Mauritius [**35**, p. 750] was reported by G. Orian (pp. 1042–1048). Studies on sugarcane smut (*Ustilago scitaminea*) in India [**37**, p. 418 *et passim*] were presented by N. V. M. Rao & P. Prakasam (pp. 1048–1057).

C. A. Schexnayder (pp. 1058–1065) surveyed sugarcane ratoon stunting disease in Louisiana [**37**, p. 56 *et passim*] and its control. E. V. Abbott discussed (pp. 1066–1070) problems of testing sugarcane vars. against red rot (*Physalospora* [*Glomerella*] *tucumanensis* [**37**, p. 418 *et passim*]. Breeding difficulties arise from lack of immunity sources, the fact that weather conditions may unduly favour the pathogen, and its great variability and specialized biologic races; to counter these, composite inocula from mixed isolates are used to test resistance in the U.S.A. The varietal reaction to this disease in the Punjab was then dealt with by H. Singh, S. Singh, and N. Singh (pp. 1071–1078).

Helminthosporium purpurascens Bourne, parasitic on sugarcane and other Gramineae in Florida, with conidiophores 92·5–330×5·6 μ, and spores 11·1–44·8 (29·7)×9·3–14·8 (12) μ was described as new by B. A. Bourne (pp. 1079–1088). K. Kar and D. R. Singh reviewed (pp. 1089–1096) some aspects of controlling red rot in Uttar Pradesh. K. V. Srinivasan and V. V. Chenulu gave an account (pp. 1097–1107) of a preliminary study on the reaction of *Saccharum spontaneum* variants to red rot, smut, mosaic virus [**37**, p. 181], and rust [*Puccinia kuehnii*: cf. **36**, p. 212; **37**, p. 418] and also presented a note (p. 1108) on sugary disease (*Claviceps purpurea*) on sugarcane [cf. **28**, p. 545]. V. V. Chenulu (pp. 1109–1111) spoke on the first record of *Sclerospora* sp. on *Saccharum spontaneum* in India [**33**, p. 562]. L. L. Farrar and R. J. Steib (pp. 1111–1126) presented studies on the *Sclerophthora* disease of sugarcane and Johnson grass [*Sorghum halepense*] in Louisiana, caused by *S.* [*Sclerospora*] *macrospora* [cf. **32**, pp. 278, 631]. N. C. King, in a paper (pp. 1126–1134) on the major sugarcane diseases of Natal, including the virus diseases streak of Uba (now a disease of the past), mosaic [**36**, p. 727], chlorotic streak, and ratoon stunting [**35**, p. 721], and also smut, red rot, and some minor diseases, noted that the loss of yield caused by them, except possibly by ratoon stunting, was very small.

S. L. Sharma described (pp. 1134–1168) morphological modifications in sugarcane brought about by systemic infection by smut, noting the general reduction in size of stem and leaf, proliferation and suppression of floral parts, and abnormal gall and 'whip' formation, the last being regarded as a stem rather than an inflorescence; the physical presence of fungal mycelium was apparently not the cause of these modifications. E. H. Todd, in a paper (pp. 1169–1173) on apparent resistance to ratoon stunting, noted that N.C. 116, Lataria, and Agoule 1 were symptomless carriers in Florida; B. 39246, Ba. 11569, and CI 41–70 ranged from resistant to immune, and C.P.I. also appeared to be immune.

Martin (F.). **La dégénérescence de la Canne à Sucre.** [Degeneration of the Sugarcane.]—*Industr. aliment., Paris*, **75**, 7–8, pp. 551–561, 8 fig., 1958.

This paper, presented at a council meeting of the Association of Chemists on 22 May 1958, comprises 3 parts, the 1st describing the symptoms of sereh virus disease, sugarcane mosaic virus, and Fiji virus disease; the 2nd dealing with control methods, principally the only effectual one, hybridization, for the development of resistant varieties; and the 3rd discussing research into the etiology of degeneration.

Steib (R. J.) & Forbes (I. L.). **Hot air for the control of the ratoon stunting disease of Sugarcane in Louisiana.**—Abs. in *Phytopathology*, **48**, 8, p. 398, 1958.

Using ovens of 2,200 lb. capacity and an 8 hr. treatment to control ratoon stunting [virus: **37**, p. 309] in 1955 and 1956 it was found that an in-going temp. of 58° C. is needed to give an oven air temp. of 54°. Subsequent germination was good, though control was not always 100%. The disease was spread in the 1st ratoon by the knives of the harvester from 2·1% in the plant cane to 16%.

Pires (J. A.). **The history of leaf scald in British Guiana, 1950–1956.**—*Sug. Bull., Georgetown*, 24, pp. 97–101, 1956. [Received Oct. 1958.]

This review of sugarcane leaf scald [*Xanthomonas albilineans*: **35**, p. 720] in British Guiana is accompanied by tables of (1) variety acreages and disease reaction during the period, and (2) disease ratings of 275 commercial vars.; 49 are now included in the R class [loc. cit.]. Severe natural infection of H. 37–1933 (regarded as resistant in Hawaii) and of N.C.O. 310 was observed in 1955.

Venkataramani (K. S.). **Report of the botanist (1957–1958).**—*Rep. Tea sci. Dep. un. Pl. Ass. S. India, 1957–8*, pp. 16–22, 1958.

In further fungicide trials against tea blister blight [*Exobasidium vexans*: cf. **36**,

p. 131; **37**, p. 58] experimental compounds of low Cu content proved ineffective on the whole, though a good Cu oxide at dilutions higher than usually recommended was satisfactory. Estimates of disease incidence based on 'two and a bud' are considered good.

Die-back of tea shoots in the Anamallais during the S.W. monsoon season was associated with *Colletotrichum camelliae* [*Glomerella cingulata*: cf. **32**, p. 455], which proved pathogenic in the laboratory. A fungus isolated from the branches of young tea plants with severe die-back in the Nilgiri-Wynaad was identified as *C.* sp. but differed in its spore dimensions from *C. camelliae.*

Stahmann (M. A.) & Gothoskar (S. S.). **The inhibition of the infectivity of Tobacco mosaic virus by some synthetic and natural polyelectrolytes.**—*Phytopathology*, **48**, 7, pp. 362–365, 1958.

At the University of Wisconsin, Madison, polyglutamic and polyacrylic acids, both at 5–33 mg., and sodium polypectate (0·5–2·5), mixed with 2·9 μg. tobacco mosaic virus/ml. 0·1 M phosphate buffer (pH 7), reduced the number of lesions on half-leaves of *Nicotiana glutinosa* × tobacco, inoculated by carborundum rubbing, by 63–93% [cf. **31**, p. 404]. When polyglutamic acid was applied to the leaf surface and allowed to remain for 1 hr. before washing off and virus inoculation, infectivity was reduced by 30 %, but if the acid was washed off immediately after application and the plants then inoculated, or if the leaves were treated for 1 hr. after inoculation, infectivity was not reduced, suggesting that the action is on the plant cells, rather than on the virus. The fact that the reduction was greater on the hybrid than on *N. glutinosa* also supports this hypothesis.

Similar results were obtained with culture filtrates of *Trichothecium roseum* [**31**, p. 369], but the inhibitory action here was considerably reduced by treatment with a weak anion exchange resin (amberlite-IR-4B), suggesting that it is partly attributable to acidic compounds and is comparable to that of the polypeptides. The authors postulate that combination of acidic polyelectrolytes with basic receptor sites of susceptible host cells, blocking them, is responsible for the inhibitory effect.

Schlegel (D. E.). **The organic acid composition of healthy and Tobacco mosaic virus-infected Tobacco plants.**—*Virology*, **6**, 1, pp. 1–7, 1958.

In tests at the Dept of Plant Pathology, University of California, Berkeley, healthy and mosaic-infected mature leaves of Turkish tobacco floated on water accumulated glyceric acid [cf. **37**, p. 184] during the 1st 3 days; it then practically disappeared from the diseased during the next 24 hr., their content being 8 times less than that of healthy ones.

Benda (G. T. A.). **The introduction of Tobacco mosaic virus into single hair cells of Nicotiana langsdorfii leaves. I. The concentration of virus.**—*Virology*, **6**, 1, pp. 49–54, 1 graph, 1958.

At the Virus Laboratory, University of California, Berkeley, inoculation of single epidermal hair cells with the green aucuba strain of tobacco mosaic virus [cf. **37**, p. 183] resulted in the development of local lesions: inocula containing 12 mg. virus/ml. and $\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1000}$ of this conc., each inoculated into 50 hair cells, gave rise to lesions in 15, 9, 6, and 3 cases, respectively.

Wehrmeyer (W.). **Darstellung und Strukturordnung eines Tabakmosaikvirus-Einschlußkörpers in der Zelle.** [Demonstration and structural arrangement of a Tobacco mosaic virus inclusion body in the cell.]—*Naturwissenschaften*, **44**, 19, pp. 519–520, 3 fig., 1957.

At the Botanisches Institut, University of Münster, Westphalia, the structure of

tobacco mosaic virus particles was studied in leaves and petals of Samsun tobacco, fixed in buffered osmic acid and subsequently treated with 1% uranyl acetate to improve contrast. The hexagonal prisms [cf. **29**, p. 539; **37**, p. 596] consist entirely of virus material and have no limiting membrane, though there may be a surface layer of associated cytoplasm. They are laminated at right angles to the hexagonal axis, the individual laminae consisting of parallel rods about 300 mμ in length. With insufficient fixation the particles of adjacent laminae aggregate end-to-end so that while the shape of the prism remains unchanged its internal structure appears fibrillar.

Bawden (F. C.). **Reversible changes in strains of Tobacco mosaic virus from leguminous plants.**—*J. gen. Microbiol.*, **18**, 3, pp. 751–766, 2 pl. (9 fig.), 1958.

Some of this information from Rothamsted Experimental Station on strains of tobacco mosaic virus obtained from systemically infected cowpea plants in Nigeria [**35**, p. 415] and from sunn hemp in India [**29**, p. 413] has been noted [**35**, p. 866]. The different strains obtained from these hosts, tobacco, and Prince and Pinto beans (*Phaseolus vulgaris*) shared few antigens and had different amino-acid constitutions. As the changes were reversible it would appear to be unlikely for them to occur merely because different hosts select different strains from existing mixtures. Both forms of the viruses may occur in all hosts, but no evidence was obtained that sap from systemically infected beans contains the tobacco forms in amounts necessary to cause infection.

The change after transfer to a new host appears to occur because mutants produced in that host move more readily than the infecting form and become systemic. The bean forms multiply more extensively in tobacco at temps. over 30° [C.] than at 20°, though they seem not to produce forms giving a systemic mosaic; at 20° many tobacco plants develop only local lesions; systemic infection, indicating the presence of the tobacco forms, occurs more often in young seedlings than in mature plants.

The results do not support the view that hosts act as 1-way filters which allow only 1 of the types causing initial infection to pass the inoculated leaves. The data suggest that the tobacco form occurs in tobacco plants inoculated with the bean form only after the bean form has multiplied in the inoculum and because of this multiplication. The change from either form of the virus to the other can be explained, apparently, only on the ground that the hosts select variants that originate in them. It appears that some of the reversible changes affect only virulence towards tobacco, without greatly changing the physico-chemical properties, while others lead to much larger differences.

Bawden (F. C.) & Kleczkowski (A.). **An electrophoretic study of sap from uninfected and virus-infected Tobacco plants.**—*Virology*, **4**, 1, pp. 26–40, 7 fig., 1957.

This study at Rothamsted Experimental Station [cf. **36**, p. 811] showed that the number and conc. of electrophoretically distinct sap components from uninfected tobacco leaves varied with the state of the leaf and its position. None seemed to be homogeneous. Infection with tobacco mosaic virus or potato virus X (but not tobacco etch or potato virus Y) introduced new components. The conc. of normal proteins was unrelated to the severity of leaf symptoms and was inconsistently affected by infection. Potato virus X and tobacco mosaic virus had no more effect together on the normal proteins than alone.

Schuster (G.). **Untersuchungen über die Auswirkungen von Virusbefall auf den Alkaloidgehalt verschiedener Arten und Sorten der Gattung Nicotiana L.**

[Studies on the effects of virus infection on the alkaloid content of various spp. and vars. of the genus *Nicotiana* L.]—*Phytopath. Z.*, **32**, 3, pp. 335–339, 1958.

At the Institut für Phytopathologie, Karl Marx University, Leipzig, infections produced by potato virus X in *Nicotiana* vars. or spp. similar to *Datura* spp. [**37**, p. 365] caused variations of the alkaloid content, the extent of which were subject to certain modifications depending on the interval following infection. Soon after infection the alkaloid in young, rapidly growing plants is considerably increased, compared with the controls. In time, however, it conforms to that of healthy plants and later on sometimes falls considerably below it. The results obtained by paper chromatography suggest that the virus increases the tendency to demethylize nicotine into nor-nicotine.

San Juan (M. O.). **Occurrence of the leaf curl disease of Tobacco in the Philippines.** —*Philipp. Agric.*, **41**, 10, pp. 527–530, 2 fig., 1958.

Tobacco leaf curl virus disease [map 147] is reported for the 1st time in the Philippines, on Virginia tobacco at the Dept. of Agronomy, Laguna.

Patino (G.). **A new strain of Tobacco streak virus.**—Abs. in *Phytopathology*, **48**, 8, p. 463, 1958.

A virus isolated from peas in S. Idaho caused primary and systemic necrotic symptoms on 30 bean [*Phaseolus*] vars. The symptoms on various hosts and the results of cross-protection tests suggest relationship to tobacco streak and [bean] red node [str. of tobacco streak] viruses, from which it differs, however, in host range and some physical properties. Plants of Amaranthaceae and Compositae, *inter alia*, proved susceptible. The virus was inactivated at 62–64° C. and withstood dilution of 2,000×, but not 4,000×. Infectivity survived 65 days in dry plant tissue at room temp. There was no evidence of seed transmission.

Everette (G. A.). **Strains of Fusaria and their effect on Tobacco varieties.**—*Tobacco, N.Y.*, **146**, 13, pp. 19–25, 1958. [Abs. in *Biol. Abstr.*, **32**, 9, p. 2668, 1958.]

No significant difference was noted between the results of laboratory and field tests on the resistance of tobacco vars. to *Fusarium*. The laboratory method was satisfactory only when several plants of a strain were tested. The separation of the various strains of the fungus appeared to require a wide range of test plants. Inoculation of cotton, sweet potato, and several tobacco vars. with 22 *Fusarium* isolates indicated that all were variants or physiological races of *F. oxysporum* [cf. **37**, p. 459].

Yamaguchi (Y.). **On some cultural characters of Tobacco black root rot fungus, Thielaviopsis basicola (Berk. et Br.) Ferraris.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 204–210, 2 fig., 8 graphs, 1957. [Japanese. Abs. from English summary.]

Asparagine and amino acids were the most effective N sources for the growth and spore formation of 3 cultural types (1, 11, 13) of *T. basicola* [cf. **36**, p. 205], the kind influencing endoconidial and chlamydospore formation. None of the isolates utilized nitrate N. There was a correlation between the pH of the medium and opt. temp. for growth (22° C. at pH 5 and 7·5, 26° between these).

Reyes Leal (L.). **Enfermedades del Tomate en el Valle del Cauca.** [Tomato diseases in the Cauca Valley.]—*Acta Agron. Palmira*, **7**, 3–4, pp. 193–221, 17 fig., 1957. [English summary].

The following, noted in the Cauca Valley, Colombia, are described: *Pythium*, *Fusarium*, and *Rhizoctonia* spp. causing damping off of seedlings; *Fusarium*

oxysporum f. [*F. bulbigenum* var.] *lycopersici*, *Alternaria solani*, *Cladosporium fulvum* [map 77], *Phytophthora infestans* [**36**, p. 140], *Sclerotium rolfsii* [map 311], *Stemphylium solani* [map 333], *Erwinia carotovora*, 'mosaic' [tobacco mosaic virus], necrosis caused by an unidentified virus, 'cat face', to which the vars. Marglobe and Manalucie proved highly resistant, growth cracks, blossom end rot, and sun scald.

Dyula (M.). Селекция Томатов в Венгрии. [Tomato selection in Hungary.]— Международ. с.-х. Журн. [*Internat. agric. J.*], *1958*, 2, pp. 96–104, 6 fig., 1958.

In tests since 1955 at the Agricultural Research Institute for the region between R. Danubo and R. Tisza the hybrid, tomato × *Lycopersicon hirsutum*, was the most resistant to tobacco mosaic virus and *Fusarium* [*bulbigenum* var. *lycopersici*], and Kecskemét 15 × *L. peruvianum* to tobacco mosaic virus and *Septoria lycopersici* [**35**, p. 397].

Simons (J. N.) & Coe (D. M.). **Transmission of pseudo-curly top virus in Florida by a treehopper.**—*Virology*, **6**, 1, pp. 43–48, 1 fig., 1958.

In studies during 1953–58 at the Everglades Experiment Station, Florida, the occurrence of 'pseudo-curly top disease' in commercial tomato plantings [**30**, p. 492] was found to be associated with the occurrence in *Solanum gracile* plants nearby of symptoms as described by Severin [**8**, p. 623] for [beet] curly top virus in this host. During an intensive search for possible vectors, specimens of a treehopper, *Micrutalis* sp., trapped by sweeping infected *S. gracile* plants, were found to transmit infection to both *S. gracile* and tomato. The disease affects tomato crops throughout S. Florida. The identity of the virus remains uncertain.

Gäumann (E.). **L'influence de la nutrition en fer sur la sensibilité des plantes de Tomates envers la lycomarasmine.** [The influence of iron nutrition on the susceptibility of Tomato plants to lycomarasmin.]—*C. R. Acad. Sci., Paris*, **244**, pp. 1429–1431, 1 graph, 1957.

In further experiments with tomato plants grown [at the Technische Hochschule, Zürich] in nutrient solutions containing progressively increasing concs. of Fe, the injury caused by a given dosage of lycomarasmin [cf. **35**, p. 555; **36**, p. 792] remained quantitatively at a minimum; qualitatively, the symptoms changed (between a normal and a double dose of Fe) from those of Fe deficiency to those of excess.

The Fe content of the leaves of plants receiving only $\frac{1}{16}$ normal Fe was so low that necroses typical of Fe deficiency were macroscopically evident; also there was a tendency for lycomarasmin to remove the Fe ions from those enzymatic systems still functioning. Hence the injuries caused by lycomarsmin appear similar to those which develop spontaneously and are largely associated with a lack of Fe, aggravated or deliberately induced.

Increased Fe increases the Fe content of the leaves and stems and the quantity removed by the lycomarasmin and liberated in the leaves, gradually counterbalancing the effect of local chelation. Thus the damage caused by a given dose of lycomarasmin lessens as the Fe conc. increases.

Gäumann (E.). **Über die Wirkungsmechanismen der Fusarinsäure.** [On the mode of action of fusaric acid.]— *Phytopath. Z.*, **32**, 4, pp. 359–398, 18 graphs, 1958. [68 ref.]

In further studies at the Eidgenössischen Technischen Hochschule, Zürich, the author found that fusaric acid [**36**, p. 736; **37**, p. 681] is transported in the transpiration stream of tomato shoots and concentrated specifically in the pith, in the tissues over and between the vascular bundles, and in certain parts of the interveinal

areas of the leaves. Increasing conc. damages the water permeability of the protoplasm in different ways. The semipermeability of the plasma membrane is affected in such a manner that metallic ions, amino acids, and peptides migrate from the inside of the cell into the transpiration stream, thus disturbing the osmotic pressure and turgor. There is little chemical differentiation in the fusaric acid molecules and therefore they and the component groups can participate in the most varied physiological mechanisms and structural parts of the host cells. Certain injurious effects, for instance the chelating of heavy metal ions, increase steadily with increasing conc.; other injurious effects, however, such as injury to the water permeability, are reversed. As the fusaric acid level varies in different parts of the plant and in different tissues it is difficult to assess its injurious effects.

Calo (Ruth P.). **Anthracnose of Tomato.**—*Philipp. Agric.*, **41**, 5, pp. 273–287, 5 fig., 1957.

An account of the disease and its causal organism *Colletotrichum phomoides* [cf. **33**, p. 123 *et passim*] as it occurs in the Philippines [**10**, p. 439]. Conidia remained viable on diseased fruits for 6 months. The presence of the fungus mixed with the seed reduced germination.

Day (P. R.). **Autogenous necrosis in the Tomato.**—*Plant Path.*, **7**, 2, pp. 57–58, 1 fig., 1958.

In June 1957 symptoms which closely resembled those of 'autogenous necrosis' [**27**, p. 543] affected Syston Cross tomatoes, an F_1 hybrid immune from *Cladosporium fulvum*. Small, brown, necrotic spots appeared on the lower leaf surface, enlarged, became brown at the centre, and coalesced. Many plants also developed a severe chlorosis, the leaf area sometimes presenting a scorched appearance. In 4 outbreaks reported to the John Innes Horticultural Institution 2–13% of the plants were affected. The cause of the necrosis is probably genetic, associated with a gene for resistance to *C. fulvum*.

Principal pests and diseases of Eucalyptus outside Australia.—*Unasylva*, **12**, 2, pp. 77–79, 1958. [30 ref.].

The fungal diseases [cf. **36**, p. 73 *et passim*] noted in this compilation by F.A.O. Staff include a stem tumour caused by *Cylindrocladium* sp. [cf. **31**, p. 524] on young plants and *Ganoderma sessile* on injured trees of *E. citriodora* in S. America; *Botrytis cinerea* (of minor importance) in various countries [cf. **28**, p. 316]; *Lembosiopsis eucalyptina* on foliage of *E. delegatensis* and *E. globulus*; *Stereum hirsutum* on stool shoots of *E. globulus*, on old trees of *E. diversicolor*, and shoots from stumps of *E. saligna* in S. Africa [**16**, p. 784]; *Cercospora eucalypti* [cf. **37**, p. 317] attacking leaves in Belgian Congo and S. America; and a canker in Cyprus, apparently connected with the beetle *Phoracantha semipunctata*.

Miller (P. W.), Painter (J. H.), & Rawlings (C. O.). **Blackline and rootrots of Persian Walnut in Oregon.**—*Misc. Pap. Ore. Agric. Exp. Sta.* 55, 31+32 unnumbered pp., 4 pl., 1958.

Persian walnut trees (*Juglans regia*) grafted on eastern black walnut (*J. nigra*) are not quite as susceptible to the blackline disorder, the main cause of decline and death of Persian walnut on black walnut in Oregon [**12**, p. 601], as those grafted on *J.* [*californica* var.] *hindsii*; var. Mayette is less susceptible than the Franquette. The condition never occurs if *J. regia* is on *J. regia* stock. The disorder was present on all types of soil, but particularly on the relatively 'heavy', shallow, upland soil derived from igneous rocks. It occurs with grafts at all levels in trees of 3·3–29·3 in. trunk diam., especially those 11–13 in., but those above 20 in. are less likely to become affected. Of 730 affected trees growing on 6 soil types 61% were still in

production 5 yr. after blackline was 1st found; of the remainder 4·9% had gone out after 1 yr., 14·8 after 2, 28·5 after 3, and 27·1 after 4.

Armillaria mellea, crown rot (*Phytophthora cactorum*), and *Phytophthora* root rot (*P. cinnamomi*) were more frequent on Persian walnuts grafted on black walnut than on Persian walnut rootstocks, small and large trees being equally susceptible, and soil type having no relation to disease incidence. Certain more vigorous Persian walnut seedlings, e.g. Manregian, are recommended as rootstocks in place of black walnut.

Poplars in forestry and land use. —*F.A.O. For. & For. Prod. Stud.* 12, x+511 pp., 1 pl., 251 fig., 24 diag., 15 graphs, 6 maps, 1958. $3.50 or 17*s.* 6*d.* [13 pp. ref.]

A section of this study (pp. 320–356), prepared by the Standing Executive Committee of the International Poplar Commission, deals with diseases of poplars [**31**, p. 260; **32**, p. 107; **34**, p. 495] under inorganic and pathogenic agencies, the latter also being listed alphabetically on p. 497. An appendix (pp. 357–359) covers precautions recommended for the transmission of poplar propagating material from one country to another.

Etheridge (D. E.) & Laut (J.). **Fungi associated with living and dead branches of pole-sized Aspen.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **14**, 4, pp. 2–3, 1958.

It was noted during preliminary studies on fungi and factors influencing early decay of pole-sized aspen [**37**, p. 743] in the Lesser Slave Lake Region, Alberta, that decay occurred more often in the heartwood of broken branches than of intact dead branches, suggesting correlation with the physical condition of the wood. *Libertella* sp. (predominant) [loc. cit.], *Phoma* sp., and *Cytospora chrysosperma* [*Valsa sordida*] (newly recorded as a heartwood saprophyte), were among the 1st organisms to colonize intact branches soon after their death, while *Fomes igniarius* [**37**, p. 742] appeared late in the succession of fungi. A moisture content of 21–130% of oven dry weight favoured the imperfect fungi, while the wood destroying fungi required 50–120% moisture, 70% of infections occurring in the range 80–100%, so that they may be excluded from dead trees on account of the low moisture content (16–85%).

Oshima (N.). **Physiology of Hypoxylon pruinatum (Klot.) Cke.**—*Diss. Abstr.*, **18**, 1, p. 9, 1958.

At the University of Minnesota 22 mass and single spore isolates of *H. pruinatum* were placed in 3 groups according to whether their growth on potato dextrose agar was rapid, medium, or slow; only the last produced conidia abundantly and rapidly. Five sporulated at 5, 10, and 25° C. (opt.). A mixture of thiamine and biotin was necessary for conidial production, while D-galactose was the best sugar source for one isolate and D-fructose for another. The best ascospore germination was obtained on malt agar at 25°; it was inhibited by phelloderm bark of quaking aspen [*Populus tremuloides*], largetooth [*P. grandidentata*], and cottonwood [*P.* sp.] and was stimulated by the phellem.

Henry (B. W.) & Hepting (G. H.). **Pest occurrences in 35 of the southwide Pine seed source study plantations during the first three years.**—*Tech. Pap. Sth. For. Tree Impr. Comm.* 18, 7 pp., 3 fig., 1957. [Received Sept. 1958.]

In these plantations situated in 15 States fusiform rust [*Cronartium fusiforme*: **37**, pp. 562, 686] has built up rapidly on loblolly [*Pinus taeda*] and slash pine [*P. elliottii*]; different seed sources show varying susceptibility. Brown spot needle disease (*Scirrhia acicola*) [**34**, p. 197] was common on longleaf pine [*P. palustris*] but was successfully controlled by fungicides. Together with *Hypoderma* needle blight (*H. lethale*) [**34**, p. 118] it occurred also on loblolly pine, and as no control is being practised they may cause some growth loss.

Graham (D. P.). **Results of pole blight damage surveys in the Western White Pine type.**—*J. For.*, **56**, 9, pp. 652–655, 1 fig., 1958.

In a survey of 16 sample-plots distributed throughout the known range of the disease in Idaho and Montana [**37**, p. 685] stands were grouped into 3 classes based on the time of infection, recent, intermediate, and old. Percentage of infection indicated appreciable damage even in the recently affected stands, with reduction in stocking, size class, dominance, and composition of the most valuable spp. It appears that the present rate of deterioration will eliminate white pine as a commercially important species in many affected stands in a relatively short time.

Purnell (Helen M.). **Shoot blight of Pinus radiata Don. caused by Diplodia pinea (Desm.) Kickx.**—*Bull. For. Comm. Vict.* 5, 10 pp., 1 pl. (3 fig.), 1 map, 1957.

Investigations carried out in the Ovens Valley, Victoria, where shoot blight [cf. **37**, p. 116 and below] is widespread on 1–6-yr.-old natural regeneration pine, indicated that infection occurred most readily during periods of rapid growth and under conditions of high temp. and humidity, being significantly greater at lower altitudes. The opt. for fungal growth on malt agar was 80° F., and none took place at 44°; 75–88° was opt. for spore germination, which was equally good in a moist atmosphere or in water; no germination took place below 50°. Isolates from different infected shoots behaved uniformly, but living shoots yielded more virulent isolates than dead ones. Only damaged needles became infected by inoculation. No damage was caused to seedlings by culture filtrates.

Millikan (C. R.) & Anderson (R. D.). **Dead top of Pinus spp. in Victorian plantations.**—Reprinted from *Aust. For.*, **21**, 1, 11 pp., 3 pl., 1957.

Several pine plantations in Victoria suffered severely in 1951 from dead top [cf. below], associated with dense stands on shallow soils, an exposed site, and a hot, dry summer. The disorder was reproduced in young *Pinus radiata* grown under moisture stress conditions in the glasshouse. Results suggest that a reduction in density of planting would alleviate the symptoms. *Diplodia pinea* found in association was considered not to be parasitic.

Gibson (I. A. S.). **Dead top in Kenya Pine plantations.**—*E. Afr. agric. J.*, **24**, 1, pp. 47–52, 1 fig., 1958.

A survey of *Pinus radiata* and *P. patula* plantations in Kenya early in 1957 showed that the condition known locally as 'dead top' was by far the most prevalent abnormality and that the symptoms corresponded closely with those caused by *Diplodia pinea* [cf. **35**, p. 405 and above]. The death and casting of the needles leaves a shoot which is often largely turgid and green. Later, these sappy tissues collapse and turn brown in patches which eventually coalesce, the shoot dies, and there is colonization by insects and fungi, sometimes with internal blue-stain. Occasionally, the condition starts at the first or second node rather than at the tip. The fungi most frequently associated were *Pestalotiopsis* spp.

The condition is widespread in Kenya, but seldom becomes serious and no instance is recorded of a tree dying as a result of an attack. The absence of *D. pinea* from dead top and pine litter in Kenya is attributed in part to the relatively high opt. temp. needed for its growth; the fungi associated with the condition are more suited to the environment.

McKay (R.) & Clear (T.). **Violet root rot (Helicobasidium purpureum) on Douglas Fir (Pseudotsuga taxifolia) and Pinus contorta.**—*Irish For.*, **14**, pp. 90–97, 5 fig., 1958.

The occurrence of *H. purpureum* attacking 3-yr.-old transplants of Douglas fir and *P. contorta*, apparently new host records, was reported in Co. Wicklow, Eire, in

Nov. 1957. Wilting with down-curving of the top of the main stem occurred in Douglas fir; in both hosts there was a yellowing or browning of the apices of the branches, also destruction of the cortex of the roots, which were covered with purplish mycelium, while sterile mycelium often covered the stem bases [cf. **8**, p. 280]. The disease occurred on ground under sugar beet 4 yr. before; weeds between the rows parasitized by *H. purpureum* may have been a contributory factor, though they had been killed by a herbicide. Dipping roots of young conifers growing in contaminated ground, but free from the fungus, for 20 min. in a strong solution of $CuSO_4$ before transplanting is recommended.

Campbell (R. N.). **Studies on the biology of some wood-staining fungi.**—*Diss. Abstr.*, **18**, 1, p. 33, 1958.

During a survey of common sap-staining fungi on felled trees or lumber in Minnesota, the following were found in decreasing order of prevalence: *Ceratocystis pipifera*, *C. ips*, *C. coerulescens*, and *Leptographium* sp. on red and jack pine; *C. pipifera* and *L.* sp. on white pine; and *C. pluriannulata* (heterothallic) and *C. moniliformis* on aspen (new records). *C. piceae* was also shown to be heterothallic and *C. variospora* (from northern pin oak) and *C. ips* either homothallic or self sterile. Physiological conditions favouring the formation of perithecia by *C. variospora* [**37**, p. 706] were studied.

Cowling (E. B.). **The relative preservative tolerances of 18 wood-destroying fungi.**—*For. Prod. J.*, **7**, 10, pp. 355–359, 1 fig., 1957.

In this investigation at the N.Y. College of Forestry [cf. **34**, p. 622] standard-size blocks of *Pinus ponderosa* sapwood [cf. **37**, p. 688] were soaked for 1 hr. in 8 different concs. of 10 standard preservatives, weighed to determine the amount absorbed, dried, and then incubated in sets of 8 on malt agar inoculated with the test fungi in screw-top jars for 5 weeks at 28° C. and 65–70% R.H. Fungal penetration was estimated visually every 3 days to determine the threshold values of the preservatives. The results are tabulated. The fungi were classified as tolerant, median, or susceptible; up to 40×the amount of preservative needed to control the most susceptible was required to prevent decay by the most tolerant; 14 showed striking tolerance of 1 or more of the chemicals and also a marked susceptibility to at least 1 of the others, indicating the value of mixtures of chemically compatible materials for decay control. *Fomes subroseus* and *Polyporus tulipiferae* were unusually tolerant of 8 of the preservatives. Two isolates each of *Lenzites trabea* and *Poria monticola* varied in their reaction to the preservatives. *F. subroseus* appeared to be particularly suited for use as a standard decay test organism.

Gersonde (M.). **Über die Giftempfindlichkeit verschiedener Stämme holzzerstörender Pilze.** [On the sensitivity to toxicity of different strains of wood-destroying fungi.]—*Holz a. Roh- u. Werkst.*, **16**, 6, pp. 221–226, 5 graphs, 1958. [English summary.]

An expanded version from the Bundesanstalt für Materialprüfung, Berlin–Dahlem, of a paper already noticed [**37**, p. 563]. The author used the Kolle flask method (German standard DIN 52176) and 4 water-borne and 3 water-soluble preservatives. The commonly used standard cultures of the fungi tested [loc. cit.] in general gave average reactions.

Schulze (B.). **Wirkstoffverluste von Holzschutzmitteln durch Regen.** [Loss of efficacy of wood preservatives through rain.]—*Holz a. Roh- u. Werkst.*, **16**, 6, pp. 235–239, 3 fig., 2 graphs, 1958. [English summary.]

Pine wood samples treated with preservatives were examined at the Laboratorium fur Holzschutztechnik, Berlin-Dahlem, by immersion for a given time in a specified

quantity of distilled water. The leaching losses determined by titration were especially high with fluosilicates, but US salts, too, were not resistant to leaching nor were hydrogen fluorides, though the latter penetrate deeper and are more effective.

Becker (G.). **Holzzerstörende Tiere und Holzschutz im Meereswasser.** [Wood-destroying animals and wood preservation in sea water.]—*Holz a. Roh- u. Werkst.*, **16**, 6, pp. 204–215, 16 fig., 1958. [English summary. 100 ref.]

An expanded version from the Bundesanstalt für Materialprüfung, Berlin-Dahlem, of a paper already noticed [**37**, p. 563].

Kohlmeyer (J.). **Holzzerstörende Pilze im Meereswasser.** [Wood-destroying fungi in sea water.]—*Holz a. Roh- u. Werkst.*, **16**, 6, pp. 215–220, 10 fig., 1958. [English summary. 23 ref.]

An expanded version of a paper already noticed [**37**, p. 563]. The author deals with the morphology, physiology, wood destructive capacity, and symbiosis of marine fungi and their adaptation to life in sea water.

Conkey (J. H.) & Carlsow (J. A.). **Relative toxicity of disinfectants available for use in the pulp and paper industry—1957 supplement.**—*T.A.P.P.I.*, **41**, 8, p. 12A, 1958.

The inhibiting concentrations are listed for 23 bactericides and fungicides effective, *inter alia*, against *Aspergillus niger* and *Penicillium expansum* [cf. **37**, p. 324, and below].

Conkey (J. H.). **Laboratory testing of biostatic agents recommended for use in the pulp and paper industry.**—*T.A.P.P.I.*, **41**, 7, pp. 140A–142A, 1958.

Two methods recently evolved to supplement the broad artificial substrate-pure culture and natural substrate-mixed culture test forms are described and briefly discussed, viz., the agar-Petri plate (American Paper and Pulp Association, 21 pp., 1958) and white water techniques (*Pulp and Pap. Ind.*, **23**, pp. 80, 82–85, 1949; *T.A.P.P.I.*, **36**, pp. 163A–166A, 1953) [cf. above and below].

Buckman (S. J.) & Kirchen (C. P.). **Economics of microorganism control in the paper industry.**—*T.A.P.P.I.*, **41**, 7, pp. 144A–149A, 5 graphs, 1958.

From the results of studies at the Buckman Laboratories, Inc., Memphis, Tennessee, it is estimated the total loss caused by [unspecified] microbiological growth in stocks and throughout the pulp and paper mill systems ranges from $1 to 5 or more /ton and is therefore much heavier than has been generally recognized in the industry. In planning a sound control programme [cf. above] all the various types of losses should be taken into careful consideration, since the omission or incomplete evaluation of some of the less obvious ones has frequently resulted in the development of an inadequate over-all scheme. It is considered sound for the industry to increase expenditure for this purpose to the point of diminishing returns.

Sawamura (K.). **On the powdery mildew of Cabbage.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 166–167, 2 fig., 1957. [Japanese. Abs. from English summary.]

The powdery mildew observed in Japan since 1953 on mustard, rape, and cabbage, very closely resembles *Erysiphe polygoni* in size and shape of the conidia and germ tubes; its perfect state has not yet been found. Conidia from cabbage infected cabbage and rape, but not cauliflower, Japanese radish, tobacco, or pea.

Taylor (R. E.) & Morgan (W.). **Club root survey in Wales, 1956.**—*Plant Path.*, **7**, 2, pp. 61–63, 1958.

The results are reported of the 1st survey of Wales for the presence of club root of

brassica crops [*Plasmodiophora brassicae*: cf. **4**, p. 460], conducted in 1956. It was based on the examination in each district of approximately 10 crops of swede, turnip, rape, kale, or cabbage, together with chemical analysis of a soil sample from each. Information recorded included level of infection, variety, extent and distribution of damage, previous cropping, manurial treatment, soil type, and topography. Swedes were most frequently affected and kale least. No definite correlation was evident between any particular outbreak and the taking of a susceptible crop in the previous 4 yr., nor, for swedes, between soil pH and attacks, but the highest proportion of affected crops occurred at levels of available Ca below 400 mg./100 g. [cf. **16**, p. 222].

Macfarlane (I.). **A solution-culture technique for obtaining root-hair, or primary, infection by Plasmodiophora brassicae.**—*J. gen. Microbiol.*, **18**, 3, pp. 720–732, 3 graphs, 1958.

To evaluate the effects of environment on primary infection by *Plasmodiophora brassicae* (i.e. infection by primary zoospores emerging from resting spores) a technique was developed at Rothamsted Experimental Station [**36**, p. 816; **37**, p. 633] in which 2-day-old King of Hearts cabbage seedlings were grown in a suspension of resting spores in Hoagland and Snyder's nutrient solution [**14**, p. 376] with double phosphate conc. in glass tubes bent to form a shallow U or in small vials. Abundant infections were obtained, zoosporangia usually forming after 3 or 4 days' growth at 25° C. in the dark. After 4–6 days' incubation the roots were removed to acetocarmine and the zoosporangial sori in the root hairs counted [cf. **24**, p. 484].

A roughly linear relationship was established between the log. of the number of infections/root and the logs. of spore conc. in the medium. Infections were usually more numerous at 1/5 or 1/25 dilution of the culture solution than at the standard conc., but were fewer or were lacking completely in more dilute (1/125) or more conc. (×5) solutions. The conc. at which max. infection occurred tended to vary from one experiment to another. The infection rate was not affected by changing from pH 5 to 6 but was much decreased at pH 8.

Mazunina (Mme V. N.). Действие продуктов жизнедеятельности актиномицетов антагонистов на возбудителя слизистого бактериоза Капусты. [The activity of actinomycetes antagonistic to the causal agent of bacteriosis of Cabbage.]—Труд. Инст. Микробиол. Вирусол. АН Казак ССР [*Trud. Inst. Microbiol. Virol., Acad. Sci. Kazakh S.S.R.*], **2**, pp. 80–87, 1958.

Of the 52 bacterial isolates from diseased cabbage, only strains 17 and 19 of *Bacterium carotovorum* [*Erwinia carotovora*: **35**, p. 255] proved to be pathogenic. The greatest numbers of actinomycetes antagonistic to *E. carotovora* were found in black soils.

Treating infected cabbage seeds with a suspension of *Actinomyces* [*Streptomyces*] *longisporus ruber* for 20 hr. decreased infection by 64%, and for 8 hr. by 40%, germination of both lots being increased by 5% over the untreated.

Bontea (Vera) & Bucur (Elena). **Două boli importante la Varză și combaterea lor.** [Two important diseases of Cabbage and their control.]—*Grădina, Via și Livada*, **7**, 8, pp. 40–44, 4 fig., 1958. [Russian, French, English, and German summaries in suppl.]

In tests in Romania in 1955–6 early sown cabbage suffered least from 2 of the most severe diseases locally (*Xanthomonas campestris* and *Phoma lingam*) [cf. **37**, p. 515]. Red cabbage alone was resistant to *P. lingam*; all other vars. were susceptible to both pathogens. The best control (no infection by *P. lingam*) was obtained by hot water treatment of the seed at 50° C. for 20 min., followed by rapid cooling and drying.

Chiu (W.-F.), Yuen (C.-S.), & Wu (C.-A.). **On the overwintering and dissemination of the soft-rot organism, Erwinia aroideae (Towns.) Holland.**—*Acta phytopath. sinica*, **4**, 1, pp. 8–15, 2 fig., 1 diag., 1958. [Chinese. Abs. from English summary.]

The absence of *E. aroideae* from thawed soil in spring indicates that the source of infection of Chinese cabbage [**37**, pp. 60, 746] is either the undecomposed cabbage residues in the field, from which the bacterium is readily isolated, or the debris in the cabbage storage cellars. The disease is spread by bees and other insects (from 30–76% of 5 common spp. found in the field or the cellars being infected), or by irrigation water: removal of diseased plants before irrigation is therefore recommended.

Chiu (W.-F.), Dih (Y.-P.), & Yuen (C.-S.). **Studies on the longevity of Erwinia aroideae (Towns.) Holland under different soil conditions.**—*Acta phytopath. sinica*, **4**, 1, pp. 16–24, 3 graphs, 1958. [Chinese. Abs. from English summary.]

At Peking University of Agriculture *E. aroideae* [see above] added to non-sterile soil at 28° C. did not survive longer than 14 days; this was ascribed to the breakdown of the biological equilibrium of the soil population in favour of indigenous organisms which increased in plate counts; at 35° *E. aroideae* survived for 11 days, in soil in which Chinese cabbage plants were growing, at 10° for 21, and at 20° (possibly opt. for the activities of antagonistic organisms) for 7 days only. Addition of 'de-oiled soybean seed-cake' or 'dried night soil' to soil accelerated the elimination of *E. aroideae* (within 24 hr. and 5 days, respectively), but the autoclaving of soil with added compost or manure allowed the bacteria to survive for 180 days, compared with 90 days in autoclaved soil alone.

Heyland-Steinhilber (Hedwig). **Untersuchungen über ein in Württemberg an Kohlrüben (Brassica napus rapifera) vorkommendes Virus.** [Studies on a virus occurring on Swede (*Brassica napus rapifera*) in Württemberg.]—*Phytopath. Z.*, **32**, 2, pp. 181–206, 3 fig., 3 graphs, 1958.

The symptoms 1st observed in Württemberg in 1939 and studied at the Institut für Pflanzenschutz der Landwirtschaftlichen Hochschule, Hohenheim, Germany, were a mottling, mosaic speckling, light and dark-green bulging, and strong crinkling of the leaves; necrotic leaf lesions and vein necrosis followed later. The growth of the root was retarded. Often the plants died when artificially infected. The symptoms did not vary much according to the variety or with isolates from different areas, but they appeared to develop in stages during the vegetative phase and often became masked towards the end of it.

Inactivation occurred at 59° C. and untreated sap remained infectious for 90–120 hr. at 22°; isolated infections occurred at 1 : 10,000. In host range tests 15 spp. of Cruciferae and Solanaceae were susceptible. Seed and soil transmission do not occur and how the virus overwintered was not determined.

The virus most closely resembled the T1, T6, T8, and T9 strains of the turnip mosaic virus of Le Beau and Walker [**24**, p. 438], and also turnip crinkle mosaic of Kaufmann [**16**, p. 10]. It can be included in the group 1 (turnip mosaic virus) of Pound and Walker [**25**, p. 53]. It was transmissible by *Brevicoryne brassicae* and *Myzodes* [*Myzus*] *persicae*, but attempts to control infection with insecticides failed. The disease was also observed in Ellwangen, Alb, south and central Schwarzwald, as well as in Oberschwaben and the Danube district.

Koulounev (D.) & Manor (E.). **Les ennemis et les maladies de la Betterave sucrière en Bulgarie.** [The pests and diseases of Sugar Beet in Bulgaria.]—*Indust. aliment.*, **75**, 3, pp. 211–212, 1958.

Cercospora [*beticola*] is stated to be the most widespread pathogen [map 96]. Control

is effected by means of copper sprays, while the development of resistant varieties is proceeding at the Institute of Scientific Research, Plevensko.

Beet mosaic virus is prevalent everywhere but yellows virus has not been definitely identified in spite of suspicious symptoms [but see **37**, p. 515].

Stolze (K. V.). **Praktische Erfahrungen zu einigen Krankheiten der Zuckerrüben.** [Practical observations on some Sugar Beet diseases.] —*Zucker*, **11**, 15, pp. 347–350, 1958.

Up-to-date information on the economic importance and control of 5 diseases is presented from the Pflanzenschutzamt, Oldenburg, Germany.

The profitability of 2–3 chemical treatments against even moderate outbreaks of *Cercospora beticola* [**37**, p. 615] is stated to be assured at an approximate cost of DM. 25/ha.

Of recent years *Pythium irregulare* [cf. **31**, p. 161] has become increasingly pathogenic to full-grown plants, especially in the humus, sand, heath, and dry-land soils of N. Germany.

The usual remedy for B deficiency [**37**, p. 431] is technical borax (20 kg./ha.), which can be mixed with any synthetic non-ammonia fertilizer or with sand. It may be replaced by boric acid (14 kg./ha.) or one of the numerous commercial fertilizers with B. The best time for application is just before sowing or transplanting.

In seasons of virulent infection by beet yellows virus [**37**, p. 747, and below] the root yield may be reduced by an average of 30% and the sugar content by 1%.

Leaf curl virus [**36**, p. 743] is regarded as one of the most dangerous diseases, neglect of which may lead to heavy losses. It has spread from E. Germany into E. Lower Saxony. The organization of a special inspection service which operates in E. Hanover for the trapping and chemical extermination of the vector, *Piesma quadratum*, is outlined.

Schultz (G.). **Schädigung der photosynthetischen Assimilation nach Infektion von Zuckerrüben mit viröser Gelbsucht.** [Impairment of photosynthetic assimilation following infection of Sugar Beets by yellows virus.]—*Zucker*, **11**, 16, pp. 374–377, 2 fig., 1958.

At the Kleinwanzlebener Saatzucht, Hanover, Germany, an appreciable reduction in photosynthetic activity in 2- and 6-month-old sugar beets (inbred line of var. Kleinwanzlebener E) infected with yellows virus, compared with healthy [cf. **34**, p. 829; **36**, p. 802, *et passim*] in a modified Warburg apparatus, was detected in the obviously diseased outer leaves. Respiration was increased. The still symptomless inner leaves did not differ from healthy ones in these respects.

Malmus (N.). **Die viröse Vergilbungskrankheit in Bayern im Verlauf der letzten Jahre.** [The virus yellows disease in Bavaria in recent years.]—*Pflanzenschutz*, **10**, 4, pp. 48–54, 1958.

The incidence of beet yellows virus in Bavaria during 1949–1957 is discussed in relation to local conditions [**36**, p. 565].

Orth (B.). **Zur Bekämpfung der Vergilbungskrankheit in Rheinhessen-Pfalz.** [On the control of yellows disease in Rhineland-Hesse-Palatinate.]—*Zucker*, **11**, 18, pp. 423–425, 1958.

This is a statistical survey and discussion of the organization and development of the campaign against beet yellows virus which has been waged jointly by the South German Sugar Company and the regional Plant Protection Bureau, since the first appearance of the disease, in the districts of Worms, Frankenthal, and Speyer in 1952. Important economies have been effected by the institution of an aphid

warning service. In 1955 and 1956, for instance, intensive observational and advisory activity resulted in a saving of approximately DM. 325,000 in the metasystox usually applied at 800 g./ha. at a cost of DM. 42.5/h. against *Myzodes* [*Myzus*] *persicae* and *Doralis* [*Aphis*] *fabae* [**37**, p. 690]. In 1957 the area treated was 10,821 ha.

Koch (F.). **Die Versuchsergebnisse des Jahres 1957 der Arbeitsgemeinschaft zur Bekämpfung von Zuckerrübenkrankheiten, Regensburg.** [Experimental results for the year 1957 of the Arbeitsgemeinschaft zur Bekämpfung von Zuckerrübenkrankheiten, Regensburg.]—*Pflanzenschutz*, **10**, 4, pp. 43–45, 1958.

An experiment at Regensburg, Germany, comparing the effects of early and late inoculation of 4 beet vars. with beet yellows virus [see above and below] emphasized the importance of early infections. Natural infection during the year was sporadic and caused little loss. Seed treatment with the alkyl-Hg compounds, albertan and marktredewitz 5600, showed promise against *Cercospora* [*beticola*] leaf spot.

Bercks (R.) & Burghardt (H.). **Serologische Untersuchungen über die Infektion von Beta-Rüben mit dem Vergilbungsvirus in verschiedenen Entwicklungsstadien und unter wechselnden äusseren Bedingungen.** [Serological studies on the infection of Beet by the yellows virus at different stages of development and under varying ambient conditions.]—*Phytopath. Z.*, **32**, 2, pp. 207–222, 1 fig., 7 graphs, 1958.

In further studies at the Institut für Virus Serologie, Brunswick, Germany [**37**, p. 385], it was found that with infections at the cotyledon stage the earliest serological demonstration of the virus was possible after 9 days in the primary leaves, while vein necrosis, the typical symptom at this stage, appeared after 15 days. Of the first 5 leaf-pairs of young beet plants (Kleinwanzlebener E), the primary leaves had by far the highest virus content and the cotyledons the lowest. As the plants grew the virus spread into all the other leaves. In greenhouse and field plants infected at an advanced stage of development and those of corresponding age infected at the cotyledon stage the middle leaves had the highest titre; the strongest symptom development was restricted to the oldest leaves. Max. symptom intensity and titres were found in the outdoor plants, the lowest in greenhouse plants infected at the later stage.

In 2 years both seedlings and 6 months' old plants exhibited max. infection in Mar.–June and a min. Oct.–Dec.

In order to eliminate certain fluctuations in transmission results a few special infection conditions were more closely examined. It was confirmed that the number of vectors (*Myzodes* [*Myzus*] *persicae*) had a considerable effect on the infection results and the sap titre. Poor nutrition of the host affected only the infection results and not the titres.

The location of infection on older plants was of no significance where the serological test was made only after a period of time, because within 10 weeks the whole foliage of greenhouse beets was completely renewed and the plants were entirely permeated by the virus. No seed transmission was detected.

Koch (F.). **Ergebnisse eines weiteren Feldinfektionsversuches zur Frage der Rassenbildung bei Cercospora beticola.** [Results of a further field infection test on the question of race formation in *C. beticola*.]—*Pflanzenschutz*, **10**, 4, pp. 46–47, 1958.

A similar test to that in Germany in 1956 [**37**, p. 257] was made with fresh single-spore isolates from the 6 countries. With var. CR the results were essentially as before, but with E there were no very clear distinctions between the isolates, except that the Turkish was the least aggressive. Cercopoly [**36**, p. 443] was somewhat more resistant than CR.

It is concluded that there are races of the fungus differing in pathogenicity. Any grading of isolates for pathogenicity, however, would be valid only for the locality in question. Breeding material should be tested in a number of areas subject to heavy attacks and the inoculum should include the widest possible selection of isolates.

Noll (A.). **Die am Institut für Resistenzprüfung der Biologischen Bundesanstalt Braunschweig im Jahre 1957 mit Cercospora beticola durchgeführten Untersuchungen.** [Studies on *C. beticola* at the Institut für Resistenzprüfung der Biologischen Bundesanstalt, Brunswick, in the year 1957.]—*Pflanzenschutz*, **10**, 4, p. 46, 1958.

In pathogenicity tests with 25 isolates of *C. beticola* [cf. above] from various regions mycelial inoculation of the seed regularly produced heavy attacks despite weather unfavourable to infection. The isolates varied in pathogenicity to susceptible beet vars., those from S. Germany being the most virulent. With more resistant vars. there was little difference between isolates. The original isolates produced light grey mycelium in culture, but variants occurred as 'islands' of whitish, yellowish, or pink, or of abundant aerial growth, or occasionally of otherwise normal mycelium appearing pale from below. Such variants were of reduced pathogenicity and were unchanged by repeated inoculation and reisolation.

Malmus (N.). **Verspricht die Rübensamenbeizung Erfolg?** [Does Beet seed treatment promise success?]—*Pflanzenschutz*, **10**, 4, pp. 57–58, 1958.

A popular note on separate and combined fungicidal and insecticidal treatments, with special reference to dosages and costs.

Gorovets (V. K.). Биология возбудителя церкоспороза Сахарной Свёклы в условиях Белоруссии. [The biology of the causal agent of cercosporiosis of Sugar Beet in White Russia.]—Уч. Зап. Белорусск. ун.-т. [*Ucheni Zap. Beloruss. Univ.*], *1957*, 33, pp. 83–94, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 8, p. 189, 1958.]

This bio-ecological study of *Cercospora beticola* [map 96] made in 1953–4 included observations on temp. and humidity, from which meteorological charts indicating favourable conditions for the disease in the country were compiled. The duration of the incubation period is directly related to a complex of meteorological conditions, leaf age, and especially the nutrition of the plants.

Drachovská (Miroslava). **Řepné listové choroby.** [Beet leaf disease.]—*Za vysokou Úrodu*, **5**, 5, pp. 114–115, 1957. [Abs. in *Referat Zh. Biol., 1958*, 8, p. 189, 1958.]

This information on the biology and control of leaf spot (*Cercospora beticola*) of table beet in Czechoslovakia [**34**, p. 121] indicates a general decrease in yields of 50% and in some districts up to 70%. The sugar content fell by 0·5–1%. Spraying with 1% cupreol is recommended.

New or uncommon plant diseases and pests.—*Plant Path.*, **7**, 3, pp. 113–114, 1 fig., 1958.

This report by C. E. Cornford of *Pleospora betae* on stems of wild beet stacked in the open has been noticed [**37**, p. 633]. The fungus was found again in Lincs. in Jan. 1958 on stacked sugar beet crop stems.

Bernstein (Ruth). **Studies on the life history of Physoderma leproides (Trabut non P. leproides Lagerheim) Karling (= Urophlyctis leproides (Trab.) Magn.)**—*Bull. Res. Coun. Israel*, Sect. D., **6**, 1, pp. 46–52, 10 fig., 1957. [Received 1958.]

Tests at the Hebrew University of Jerusalem indicated that only very young

(forage) beet seedlings can be infected by *P. leproides* [cf. **30**, p. 125] and these only by resting sporangia after 1–2 yr. of dormancy sown in soil with beet seed. Infection occurs mainly via the leaves. Amoeboid, granular cytoplasmic masses appear in infected cells and send pseudopodia into surrounding cells where the cytoplasm becomes rearranged into compact masses from which rhizomycelia are produced, developing distal turbinate cells.

Previously limited to Miqve Israel and the vicinity of Tel-Aviv, the disease has spread N. and S. since 1947–8; the number of infected fields and the extent of infection are increasing. Sugar beet is much less affected than forage.

Boyd (A. E. W.). **Sugar beet strangles.**—*Brit. Sug. Beet Rev.*, **26**, 4, pp. 161–164, 2 fig., 1958.

Strangles in beet [**29**, p. 240] is usually first noticed in June [in Great Britain] when occasional plants fall over in a manner suggesting insect attack. Inspection at an earlier stage reveals a constriction or 'waisting' of the root, usually about 1 in. below the crown. This causes no harm at first, but later the plant breaks at the waist and sugars are released which attract insects, and induce fungal and bacterial growth. Work since 1951 at the Edinburgh and E. Scotland College of Agriculture has confirmed that the trouble begins at thinning time [cf. **29**, p. 394] and occurs in mangolds, swedes, and turnips; further studies are under way to determine the critical factor initiating the collapse of the cortical tissue exposed at singling.

Malmus (N.). **Gürtelschorfartige und andere auffälligere Krankheitserscheinungen am Rübenkörper.** [Girth-scab-like and other striking disease symptoms on the root in Beet.]—*Pflanzenschutz.*, **10**, 4, pp. 54–57, 4 fig., 1958.

From the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, the author reports observations, in poorly drained soil [cf. **36**, p. 565] in the Dachau region in 1953, of a disease of sugar beet, which in its later stages was indistinguishable from girth scab, typical cases of which were also present in the same fields. Yellowed plants, mostly in groups, were first noticed in July: there was a superficial necrosis, about 1 mm. deep, over the entire root or a part of it, directly over healthy white tissue, and the severity of leaf yellowing was in proportion to the area of root surface affected. No pathogen could be isolated. Since then only typical girth scab has been seen. At Etzenbach in 1956 and 1957 another condition caused wilting or death of Zuckerwalze plants. The roots, at the 10×5 cm. stage, bore brownish lesions of dry rot 0·5–8 cm. long and 0·5 cm. broad, cracked to a depth of up to 0·5 cm. By harvest the damage was heavy, the roots being bent or curled round the site of the lesion, which had penetrated much further. In a similar outbreak at Aufham the roots were not misshapen and the extensive internal rot was indicated externally only by a bluish grey or brownish surface discoloration or by a small hole.

The author believes that the 3 conditions described are part of a disease complex including typical girth scab [cf. **37**, p. 431].

Zaumeyer (W. J.) & Patino (G.). **A new virus-induced streak of Pea.**—Abs. in *Phytopathology*, **48**, 8, p. 464, 1958.

A virus was isolated from several pea vars. in southern Idaho with symptoms similar to those caused by New Zealand pea streak virus [**18**, p. 648], Wisconsin pea streak virus [**29**, p. 241], and pea streak virus in Virginia [**17**, p. 721]. Necrotic streaking of stems and spotting of pods occurs in the field, with slight general chlorosis and with shrivelling of badly infected pods. In the greenhouse there is a reddish-brown necrosis of stems and petioles, especially at the nodes. No leaf mottle was seen. The virus differs from the others in host range and physical properties; it is inactivated at 65–70° C., at 1:10,000 (but not 1:5,000) dilution, and after 24–48 hr. storage at 20°.

Alvarez L. (E.) & Richardson (R. W.). **El Frijol ejotero. Recomendaciones para su cultivo comercial.** [The String Bean. Recommendations for its commercial cultivation.]—*Foll. Divulg. Secret. Agric. Méx.* 26, 41 pp., 23 fig., 1957.

This booklet, issued by the Secretaria de Agricultura y Ganadería, Mexico, contains a chapter (pp. 34–41) on diseases of beans (*Phaseolus vulgaris*) caused by *Colletotrichum lindemuthianum* [**36**, p. 295], *Rhizoctonia* [*Corticium*] *solani*, *Sclerotium rolfsii*, *Fusarium* spp., *Uromyces phaseoli typica* [*U. appendiculatus*: map 290], *Pseudomonas* [*medicaginis* f.sp.] *phaseolicola* [map 85], *Xanthomonas phaseoli*, unspecified viruses, and other pathogens.

Bonilla (H. A.). **Algunas enfermedades del Frijol (Phaseolus vulgaris L.) en el Valle del Cauca.** [Some diseases of Bean (*P. vulgaris* L.) in the Cauca Valley.]—*Acta agron. Palmira*, **8**, 1–2, pp. 1–75, 12 fig., 1958. [English summary. 179 ref.]

Literature pertinent to the principal bean diseases in the Cauca Valley, Colombia, [**35**, p. 166] is reviewed. These include root rots [**34**, p. 71], powdery mildew (*Erysiphe polygoni*), rust (*Uromyces phaseoli typica* [*U. appendiculatus*]), angular leaf spot (*Isariopsis griseola*) [**36**, p. 369], leaf spots caused by *Cercospora* spp., halo blight (*Pseudomonas* [*medicaginis* f. sp.] *phaseolicola*), and blight (*Xanthomonas phaseoli*), bean mosaic virus, and baldhead [**29**, p. 600]. In the discussion of each disease information is given on the economic importance, symptomatology, etiology, epiphytology, and control.

Cárdenas C. (H.). **Persistencia de la acción protectora de varios fungicidas en el Frijol (Phaseolus vulgaris L.).** [Persistence of the protective action of some fungicides on Bean (*P. vulgaris* L.).]—*Acta agron. Palmira*, **8**, 1–2, pp. 77–100, 2 fig., 1958. [English summary.]

The following fungicides were assayed against spore germination of *Isariopsis griseola* [**36**, p. 369; **37**, p. 692] and as sprays in inoculation tests on Algarrobo beans at the Granja Agrícola Experimental, Palmira, Colombia: fermate, parzate, fuclasin, manzate, orthocide 50, oxicol-ultra, Shell copper fungicide, and thilate, with the adjuvants 'wilt pruf' and 'spreader-sticker', which were found to have a weak fungicidal action. All allowed a high percentage of spore germination (24–40%) at triple the dose recommended by the manufacturers. The protective action of the various fungicides had diminished greatly 9 days after application.

Puerta (J.) & Alonso (A.). **Pruebas de resistencia a diferentes enfermedades en diversas variedades de Judías.** [Tests for resistance to different diseases in various French Bean vars.]—*Bol. Inst. Invest. agron., Madr.*, **18**, 38, pp. 37–48, 4 col. pl., 1958. [English summary.]

The resistance of 36 Spanish vars. of beans [*Phaseolus vulgaris*] to a number of diseases was tested in greenhouses at the Plant Industry Station, Beltsville, Maryland. Of the bush dry beans, vars. 225 (del Barco) and 355 (Troncón) were resistant to bean common mosaic virus, and 234 (Borriol) to *Isariopsis griseola* [**36**, p. 369]. Of the dry bean types, No. 218 was immune from *I. griseola* and possessed some resistance to races 1 and 1a of rust (*Uromyces phaseoli*) [*U. appendiculatus*: **32**, p. 230]. No. 70 (de la Virgen) was resistant to both common and southern bean mosaic viruses [**30**, p. 257], immune from race 1a of rust, and showed good resistance to race 1.

CS–27 (San Fiacre) pole snap bean was resistant to common and southern bean mosaics and to *I. griseola*; 168–1–49 (de Manteca), CS–3 (Avellaneta negra), 369–1–50 (Bonicas), 372–1–50 (Pinta oscura), and CS–30 (Genoll) possessed good resistance to races 1 and 1a of rust.

Azzam (H. A.). **Inheritance of resistance to Fusarium root rot in Phaseolus vulgaris L. and Phaseolus coccineus L.**—*Diss. Abstr.*, **18**, 1, pp. 32–33, 1958.

In greenhouse and field studies at Oregon State College O.S.C.22 (*P. vulgaris*) was used as the parent susceptible to root rot (*F. solani* f. *phaseoli*) in crosses with a tolerant Mexican line of *P. vulgaris* and 2014 of *P. coccineus*. Seeds were inoculated by dipping in a thick emulsion of macerated agar cultures. Tolerance was recessive in the F_1. The backcross of 22×Mexican indicated the action of 3 major genes, while the F_2 and F_3 of the 2 initial crosses indicated the possible action of 2 or 3 major recessive genes conditioning tolerance, which in *P. coccineus* was not significantly related to root vigour. An apparent freedom from serious linkage is an important feature for future breeding.

Betto (E.), Foa (R.), & Volpi (A.). **La competizione per il fósforo fra Uromyces appendiculatus (Pers.) Link e Phaseolus vulgaris L. studiata con P^{32}.** [The competition for phosphorus by *U. appendiculatus* (Pers.) Link and *P. vulgaris* L. studied by means of P^{32}.]—*Phytopath. Z.*, **32**, 3, pp. 283–292, 3 fig., 1958. [German and English summaries.]

The authors consider that the accumulation of P^{32} [**36**, p. 712] detected in the infected areas of leaves of beans inoculated with *U. appendiculatus* at the Istituto di Patologia Vegetale, University of Milan, Italy, at the onset of the disease is mainly due to the requirements of the cells following the penetration and formation of the absorption organ of the parasite. After the formation and ripening of the pustules the pathogen removes the P which had previously accumulated in the cells of the mesophyll. The enrichment of P in mechanically damaged tissues is analogous to that which may occur at the onset of disease in the areas where there is later a hypersensitive reaction.

Uevich (I.). Термический способ борьбы с возбудителем антракноза Фасоли. [Thermal method for the control of the causal agent of Bean anthracnose.]—Международ. с.-х. Журн. [*Internat. agric. J.*], *1958*, 2, pp. 139–143, 3 fig., 1958.

At the Plant Science Research Institute, Prague, experiments since 1953 have shown that bean seeds [*Phaseolus vulgaris*] soaked for 15 hr. in water at 18–22° C. and then treated at 47–48° for 25 min. gave 21–24% more plants free from anthracnose (*Colletotrichum lindemuthianum*) and all free from *Pseudomonas* [*Xanthomonas*] *phaseoli*, whereas the control was heavily infected by the latter. A general heat treatment for beans throughout the country is recommended, as anthracnose has become very severe in some districts.

Dunleavy (J.). **Recent developments in Soybean disease work.**—*Soybean Dig.*, **16**, 12, pp. 14–17, 4 fig., 1956. [Received 1958.]

A popular account of recent developments in soybean disease studies in the U.S.A. [cf. **36**, p. 633], with discussion of chemical, breeding, and crop rotational methods for the control of bacterial and fungal diseases, especially *Fusarium* root rot, which either kills the seedlings or hastens the maturation of recovered plants with the production of poor quality seed. Reference is also made to stem canker [*Diaporthe phaseolorum*: **37**, p. 199], *Phytophthora* root rot [**37**, p. 626], resistance to which is being sought, and mildew [*Peronospora manshurica*], the control of which is hampered by its seedborne character and the existence of a number of pathological races [**37**, p. 625].

Probst (A. H.) & Athow (K. L.). **Additional studies on the inheritance of resistance to frog-eye leaf spot of Soybeans.**—*Phytopathology*, **48**, 8, pp. 414–416, 1958.

Segregation for reaction to *Cercospora sojina* in the F_2 populations of 18 soybean

crosses made at Purdue Agricultural Experiment Station, Lafayette, Indiana [**32**, p. 603] is tabulated. Resistance in Lincoln, Illini, Wabash, and C1076 was found to be controlled by the same gene. The behaviour of resistant × intermediate (Chief and Perry) and intermediate × intermediate indicates that intermediate susceptibility is not conditioned by modifying factors acting on resistant genes, but whether there is an intermediate gene or the gene for susceptibility is modified could not be determined.

Muskett (A. E.). **Onion smut in Northern Ireland.**—*Plant Path.*, **7**, 2, p. 75, 1958.

Urocystis cepulae [map 12] was recorded in July 1951 on young onion plants grown in Londonderry, the 1st record of the disease in Northern Ireland, where it has not been reported since.

Dyachenko (V. S.). Химический метод определения заболевания Лука шейковой гнилью. [Chemical method for diagnosing Onion collar rot.]—*Zashch. Rast., Moscow* [*Plant Prot., Moscow*], *1958*, 4, p. 53, 1958.

A substance in onion bulbs infected by *Botrytis allii* [**37**, p. 645; map 169] has a specific reaction with a reagent composed of ethyl alcohol, salicylic acid, and *o*-toluidine (10 ml., 0·4 g., 0·5 mg). The imprint of the cut surface of the bulb on filter paper is left to dry for 1 hr. at room temperature, then treated with the reagent. In 1 hr. those made by healthy and slightly infected bulbs are unchanged, whereas those of diseased ones are reddish brown. When the filter paper is exposed for 5 min. to 70–80° [C.] healthy imprints turn yellow, the slightly infected reddish, and the severely infected brown.

Sarasola (A. A.) & Sarasola (Maria A. R. De). **Nuevas enfermedades del Perejil y Sandía en Argentina.** [New diseases on Parsley and Watermelon in Argentina.]—*Rev. Fac. Agron. La Plata*, **33**, 2, pp. 161–165, 1 pl. (4 fig.), 1957. [English summary. Received Oct. 1958.]

Stemphylium radicinum on parsley leaves and *Fusarium moniliforme* [*Gibberella fujikuroi*] associated with a blossom end rot of the fruit of Favorita de Florida watermelon in the vicinity of La Plata in 1956 are described. Seed disinfection is recommended to counter the 1st and resistant vars. the 2nd.

Post-Bakker (Mrs. M.). **Boriumgebrek bij Witlof.** [Boron deficiency in Witloof.]—*Meded. Dir. Tuinb.*, **21**, pp. 162–169, 5 fig., 1958. [Reprinted as *Meded. Inst. plziektk. Onderz. Wageningen* 164. English summary.]

At the Instituut voor Plantenziektenkundig Onderzoek, Witloof chicory and sugar beet seedlings were grown in water cultures for observations on B deficiency symptoms (cf. *Parasitica*, **6**, pp. 113–116, 1950). Retardation of growth was less marked in the chicory than in the beet, but in summer both developed heart rot after 4 weeks on 0·2 mg. B, and after 3 weeks with none: at other seasons, when growth was slower, heart rot occurred after 1–2 months. This condition in chicory was characterized by death of the growing point and surrounding leaves, then of the developing axillary shoots, and subsequently of the outer leaves, in addition to internal rot of the main root. The leaves of deficient plants were narrower and more horizontal, and the secondary roots were stunted and thickened.

In field experiments on B-deficient river-clay soils in the rainy 1951–54, unfavourable for symptom development, practically no symptoms developed above ground on plants receiving no B supplement, but secondary root development was checked, and an internal brown dry rot, frequently accompanied by cavity formation, developed in the main roots. Internal necrosis did not affect the yield of forced chicory.

Grogan (R. G.), Hall (D. H.), Kimble (K. A.), & Kortsen (R. A.). **Cucurbit virus diseases in the Imperial Valley of California.**—Abs. in *Phytopathology*, **48**, 8, p. 393, 1958.

In 1957 and 1958 watermelon mosaic virus [**36**, p. 299] was found in 77% of the virus-infected samples of cantaloupe and squash tested, alone or accompanied by cucumber mosaic virus, which occurred in 30% of all the samples. In watermelon only the 1st virus was found. Squash mosaic virus [**37**, p. 437] was rare (under 1%). Squash or melon seed from plants inoculated mechanically in the seedling stage with watermelon or squash mosaic viruses transmitted only the latter (up to 25% transmission), but spread of this virus is checked in the absence of the *Diabrotica* beetle vector.

Horn (N. L.), Wilson (W. F.), & Giamalva (M.). **Hot-water inactivation of the Cucumber anthracnose organism within the seed.**—Abs. in *Phytopathology*, **48**, 8, p. 394, 1958.

Cucumber seed infected with *Colletotrichum lagenarium* [**37**, p. 437] by injecting the fruit with spore suspensions was treated in water at 50° and 60° C. for 15 and 20 min., respectively, soaked in sodium hypochlorite, and plated on potato dextrose agar. None of the 368 heat-treated seeds yielded the fungus, but from 230 only soaked in hypochlorite 22 colonies were obtained. Temps. above 58° for 20 min. reduced germination but those below did not.

Simons (J. N.). **Vector efficiency of transmission of 2 Pepper viruses as influenced by species and clone of aphid.**—Abs. in *Phytopathology*, **48**, 8, pp. 397–398, 1958.

The efficiency of a single clone of *Myzus persicae* and 3 of *Aphis gossypii* as vectors of southern cucumber mosaic virus in capsicum [**36**, p. 567] was measured over a 3-yr. period and that of 2 and 3 clones, respectively, for chilli vein banding mosaic virus [**36**, p. 568] over 2 yr. Each clone transmitted with a different efficiency, which remained constant throughout the test period and was similar for both viruses. Change of host plant had only a minor effect on efficiency.

Bazán De Segura (C.). **La marchitez ó wilt del Aji en el Perú.** [Capsicum wilt in Peru.]—*Inf. Estac. agríc. La Molina* 105, 19 pp., 13 fig., 1958. [English summary. Mimeographed.]

At the La Molina Agricultural Experimental Station it was shown by isolation and inoculation that this wilt, hitherto thought to be caused by *Fusarium annuum* [**17**, p. 724], is in fact due to *Phytophthora citrophthora*, identified also on tomato.

Varma (P. M.) & Nariani (T. K.). **Mosaic disease of Brinjal : a correction.**—*Curr. Sci.*, **27**, 8, p. 302, 1958.

In investigations at Dehli and Poona transmission of eggplant mosaic virus [**35**, p. 279] by *Empoasca devastans*, as has been reported [**26**, p. 479], was not obtained.

Wood (F. C.). **Cobweb disease (Dactylium dendroides).**—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), **7**, 1, pp. 6–9, 2 fig., 1958.

The min. and opt. temp. for growth of *D. dendroides* [*Hypomyces rosellus*: **37**, p. 260], a parasite of mushrooms and various wild fungi, are 48° and 77–78° F., respectively; it is killed by 30 min. at 115–120°. The pathogen tolerates alkaline conditions markedly. Common salt (which immobilises spread, enabling subsequent removal of infected areas) and 20% PCNB [cf. **37**, pp. 130, 629] are recommended for control.

Cleary (J. P.). **Control of cobweb disease of Mushrooms.**—*Plant Path.*, **7**, 2, pp. 74–75, 1958.

In 1957 shelf beds where cropping had been reduced by *Dactylium dendroides* [*Hypomyces rosellus*] were treated with PCNB (20% dust) 1 lb./1,000 sq. ft. 3 weeks after casing. After 2 weeks patches of infection appeared on the untreated beds only, expanding during the following week, after which the treated beds were dusted again, preventing further spread. The patches were spot-treated with double the amount used elsewhere. During 6 weeks' further cropping no patches appeared on the treated beds and from 1,100 sq. ft. of bed, 1,876 lb. of saleable mushrooms were obtained.

Krimbas (B. D.). **La dégénérescence infectieuse de la Vigne en Grèce.** [Infectious degeneration of the Vine in Greece.]—*C. R. Acad. Agric. Fr.*, **44**, 7, pp. 382–384, 1958.

Infectious degeneration of the vine [cf. **37**, p. 754] was present in Greece before invasion by *Phylloxera* [*vastatrix* f. *radicicola*: **34**, p. 706]. All vine vars. are attacked, but Savvatiano (from Attica) is very resistant. The symptoms are briefly described.

Hewitt (W. B.), Raski (D. J.), & Goheen (A. C.). **Transmission of fanleaf virus by Xiphinema index Thorne & Allen.**—Abs. in *Phytopathology*, **48**, 8, pp. 393–394, 1958.

Evidence is presented of the transmission of fanleaf [**29**, p. 601] from diseased to healthy vines growing in the same pot in soil infested with *X. index*. No transmission occurred in the absence of this vector and no symptoms developed when *X. index* was present, but no diseased vines.

Caudwell (A.). **Deux années d'études sur la flavescence dorée, nouvelle maladie grave de la Vigne.** [Two years of studies on golden flavescence, a new, serious disease of the Vine.]—*Ann. Amélior. Plantes, 1957*, 4, pp. 359–393, 6 fig., 5 diag., 3 graphs, 1 map, 1957. [English, Russian, and German summaries.]

Golden flavescence or 'the disease of Baco 22A' [**37**, p. 260], especially severe in Lower Armagnac [Gers] and Chalosse [Landes], has already spread as far as Tursan and Ténarèze. A serious attack one year may be followed by apparent recovery the next.

Baco 22A vines present a 'weeping' appearance, induced by the rubbery consistency of the year's branches, which bend over at the base. Limbs may grow slowly and have necrotic growing points or bend at the base and then grow upwards, often with short internodes and development of secondary buds, or infection may occur after growth has ceased. The branches do not ripen, the bark is not shed, and they die in winter. Some affected limbs may be symptomless.

Affected leaves have a stiff, metallic (zinc-like) appearance and feel. The edges bend down and a diffuse yellowing, later golden, spreads over them. Later, cream-yellow, sharply defined spots, a few mm. diam., appear, generally along the veins, and spread. The leaves at the base of a branch fall prematurely, sometimes without the petiole. Fruit may fail to set or fall while still green. The phloem and the medulla become greatly over-developed as compared with the wood, while little hard phloem forms. In the external phloem there are yellow, necrotic patches which spread inward and the walls appear gelatinous. Lignification is reduced. The condition does not appear to be of physiological origin though no causal organism has been found. In 2 successive years it was transmitted by grafting and may be due to a virus.

Khudyakov (Y. P.) & Kozlov (I. V.). Эпифитные микроорганизмы в борьбе с мильдью Винограда. [Epiphytic micro-organisms in the control of Vine

mildew.]—*Zashch. Rast., Moscow* [*Plant. Prot., Moscow*], *1958*, 4, pp. 22–23, 1958.

The author claims that partial control of vine mildew [*Plasmospora viticola*: **37**, p. 389] was achieved by spraying with suspensions of *Chromobacterium plymouthensis*, *Ps*[*eudomonas*] *radiobacter*, *Bact*[*erium*] *liquefaciens*, and *Proactinomyces albus* [*Nocardia alba*].

Report of the Welsh Plant Breeding Station, University College of Wales, Aberystwyth, 1950–1956.—171 pp., 2 graphs, 1958.

In the section on diseases of legumes (pp. 62–64) reference is made to current attempts by A. J. H. Carr to select a strain of red clover resistant to *Sclerotinia trifoliorum* (cf. *Rep. & Comm. 8th int. bot. Congr., Paris.*, Sect. 18–20, pp. 72–74; 155–157, 1954). Late flowering strains, though more resistant, have proved unsuitable for use in 1-year leys. The extent of variation of the fungus is under study.

In the section on breeding for disease resistance in oats (pp. 75–78) D. J. Griffiths [cf. **36**, p. 396] reports that 6 selections resistant to mildew [*Erysiphe graminis*] in the 1954 trials gave yields 25–68% higher than control vars., entirely attributable to their resistance to this disease. Over a number of years of testing in Wales and S.W. England no new forms of mildew have appeared capable of breaking the resistance developed at Aberystwyth. In the greenhouse in 1952 and 1953 Santa Fé and Landhafer proved resistant to all of the 13 races then identified.

Schreier (O.). **Das Auftreten wichtiger Schadensursachen an Kulturpflanzen in Österreich im Jahre 1957.** [The occurrence of important causes of injury to crops in Austria in the year 1957.]—*PflSchBer.*, **20**, 1–2, pp. 12–19, 1958. [English summary.]

A list recording the occurrence and severity of plant diseases, as before [**36**, p. 752]. First records for Austria are *Colletotrichum erumpens* and *Ramularia rhei* on rhubarb, *Helminthosporium carbonum* on maize, and *Puccinia aristidae* on spinach.

Neergaard (P.). **La saprofita fungo flauro de kelkaj hortikulturaj semspecoj.** [The saprophytic fungus flora of some horticultural seed species.]—*Sci. Stud.*, *1958*, pp. 201–207, 1958. [English summary.]

Most of the saprophytes detected on 501 seed samples at the State Plant Protection Service, Copenhagen, in 1952–3 [cf. below] were ubiquitous, but a *Periconia* sp. was confined to *Zinnia elegans*, which also had an unusual abundance of *Spicaria elegans* and *Trichothecium roseum*. *Acremoniella atra*, *T. roseum*, and *Papulospora* sp. are suspected of weak parasitism on *Z. elegans* and a number of other plants.

Neergaard (P.). **8, 9 Årsberetning vedrørende frøpatologisk kontrol. 1 Juni 1955 – 31 Mai 1956, 1 Juni 1956 – 31 Mai 1957.** [Eighth and ninth annual reports relating to pathological seed testing from 1 June 1955 to 31 May 1956 and 1 June 1956 to 31 May 1957.]—15 pp., 1 fig., 1957; 14 pp., 1958; Statens Plantetilsyn (Plant Protection Service), København. [English summaries.]

The horticultural seed samples examined [cf. **36**, p. 515 and above] numbered 1,253 and 1,146, respectively. In addition to the many well-known pathogens listed in earlier reports there were the following new records: in 1955 *Alternaria zinniae* on 13% (on germinated seed as well) of *Tagetes erecta*, a new host, *Heterosporium eschscholtziae* [**32**, p. 81] on *Eschscholtzia californica* already known to occur on the flowers in Denmark [**23**, p. 427]), and *Phoma* sp. with pycnidia av. 150 μ diam. and hyaline conidia 5·1 × 1·9 μ on *Thymus vulgaris*; in 1956 *Gloeotinia temulenta* on *Lolium perenne* [map 348].

Other species observed in 1955–6 included *Helminthosporium siccans* [**36**, p. 516] on *L. perenne*, *L. multiflorum*, *Festuca rubra*, *Poa trivialis*, and *Dactylis glomerata*;

H. catenarium on *F. pratensis*, *F. rubra*, the 2 *L.* spp., *Phleum pratense*, *Poa trivialis*, and *P. pratensis*; and *Dendryphium penicillatum* var. *sclerotiale* on opium poppy and *Papaver rhoeas*. In 1956–7 both *H.* spp. were present again on *L. perenne*, and *H. catenarium* on *D. glomerata*, both *F.* spp., and *Poa pratensis*. *Phomopsis occulta* [loc. cit.] was detected on *Juniperus virginiana* and *Ciboria betulae* on birch.

Annual Report East African Agriculture and Forestry Research Organization, 1957 (Record of Research for the period 1st July, 1956, to 31st December, 1957).—vii+112 pp., 1958. *Sh.* 3/50.

In the section (pp. 43–54) dealing with plant improvement and protection [cf. **37**, p. 5] D. L. Jennings reports that symptomless cassava plants may carry the virus of cassava mosaic [cf. **36**, p. 746; **37**, p. 695], while treatments causing a diversion of growth activity, such as plucking tips from or pruning growing branches may induce the development of symptoms in the young leaves of hitherto symptomless plants.

H. H. Storey and A[udrie] K. Howland (Ryland) describe further work on the breeding of maize for resistance to *Puccinia polysora* [cf. **37**, p. 406]. Evidence was obtained that a 3rd gene for resistance is present in certain maize lines from N. America. Breeding studies on resistance to maize streak virus [cf. **37**, pp. 39, 159] are also noted.

F[rances] M. L. Sheffield concludes her study on virus diseases of sweet potatoes [cf. **37**, p. 373] and also refers to sugar-cane ratoon stunting [cf. **36**, p. 425], now a major problem in E. Africa.

Regional Research Programmes 1957/1959, Agriculture, Animal Disease, Forestry. viii+83 pp., Nairobi, Govt. Printer, 1958. 10*s*.

Included in this publication, sponsored by the East Africa High Commission, are a number of research projects concerning plant diseases in E. Africa, progress of which is noticed from time to time in this *Review*.

Research and investigations (1950–1956).—*Tech. Bull. Dep. Agric. Trin. Tob.* 1, 124 pp., [1958]. $1.00 [B.W.I.].

This publication summarizes investigations carried out by the Dept Agric., Trinidad and Tobago [cf. **37**, p. 71 *et passim*], mostly since the establishment of the Central Experiment Station, Centeno. The section on plant pathology (pp. 91–112) covers, *inter alia*, work on banana leaf spot (*Mycosphaerella musicola*) and bacterial wilt (*Pseudomonas solanacearum*), citrus melanose (*Diaporthe citri*), seedling lime disease [**34**, p. 709], cacao black pod (*Phytophthora palmivora*) and witches' broom (*Marasmius perniciosus*) [cf. **37**, p. 151], and an unidentified witches' broom disease affecting the cacao shade tree *Erythrina micropteryx* [**34**, p. 19].

Heath (R. G.). **Annual Report of the Department of Agriculture, Malaya, for the year 1956.**—vii+114 pp., 4 pl., 1958.

The fungi recorded on rice seed (p. 41) in this report [cf. **37**, p. 7] have been noticed [**36**, p. 457]. *Curvularia affinis* and *Fusicladina* sp. attacked and killed young rice seedlings; *Pestalotiopsis disseminata* also proved pathogenic.

On oil palms leaf blight (*Curvularia* sp.) caused damage on seedlings in several areas (p. 47). Control was obtained by spraying with a Cu fungicide (0·1%, to avoid scorching). A leaf spot occurring in Selangor was caused by *Melanconium* sp. Basal stem rot (*Ganoderma lucidum*) [loc. cit.], generally affecting palms of 20 years or more, causes 45% mortality in some areas; fruit bodies must be removed. The cause of basal stem black rot, affecting young palms in Johore, is as yet unknown.

Red root (*Ganoderma pseudoferreum*) [**30**, p. 509] continued to cause serious damage to lowland tea (p. 68). Though *Crotalaria anagyroides* interplanted with young tea was attacked by *Poria hypobrunnea*, the tea remained unaffected.

Maize rust (*Puccinia polysora*), was found in Singapore, N. Borneo, and the Cocos Islands [map 237], but causing comparatively little damage (p. 69).

A wilt disease of pepper (p. 70) common in Johore appears similar to the 'sudden death' in Sarawak [**36**, p. 498].

New disease records (p. 76) [cf. **36**, pp. 308, 457] include maize banded sheath rot (*Corticium solani*), sweet potato black rot (*Ceratocystis paradoxa*), sudden death (*Valsa eugeniae*) on *Eugenia aquea*, loofah leaf spot (*Cercospora citrullina*), and coconut leaf spot (*Helminthosporium incurvatum*).

Outbreaks and new records.—*F.A.O. Pl. Prot. Bull.*, **6**, 8, pp. 123–126, 1 fig., 1958.

C. Bazan de Segura states that in 1957 potato wilt, associated with *Verticillium albo-atrum* and *Fusarium* sp., was again prevalent in the central valleys of the coastal area of Peru [**36**, p. 421]. The predominant symptoms were of type A, resembling those produced by *V. albo-atrum* on cotton; type B symptoms occurred in 1956, and consisted of yellowing of the leaves, the formation of aerial tubers, the presence of upright terminal shoots with leaves rolled upwards, and general wilting.

All potato plants inoculated with *V. albo-atrum* alone or with *Fusarium* sp. eventually died. Aerial tubers were not produced. Of those inoculated with *Fusarium* sp. alone only 1% of the plants died, probably owing to insect attack. The causal agent is evidently *V. albo-atrum*, the *Fusarium* sp. probably being non-pathogenic, and the production of aerial tubers probably a response to excessive soil moisture.

K. Jalavicharana reports that *Xanthomonas oryzae* [map 304] was found on rice for the 1st time in Thailand in Sept. 1957.

Husain (A.) & Kelman (A). **The role of pectic and cellulolytic enzymes in pathogenesis by Pseudomonas solanacearum.**—*Phytopathology*, **48**, 7, pp. 377–386, 7 fig., 6 graphs, 1958. [34 ref.]

Further studies at N. Carolina State College, Raleigh [cf. **37**, p. 327], showed pectin-methylesterase (PME), polygalacturonase (PG), and a cellulolytic enzyme (Cx) to be present in the culture filtrates of 3 strains of *P. solanacearum*. Tomato stem tissues were rapidly macerated in the culture filtrates, but 6-week-old cuttings in those of the weakly and non-pathogenic strains failed to wilt within 24 hr.; younger, succulent cuttings wilted only slightly, though the stems were extensively macerated. Purified fungal PG caused no wilting after 48 hr., but some maceration. In infected tomato and tobacco tissue both cellulose and pectic materials were affected by the activity (*in vitro*) of enzymes specific for these substrates, and a similar breakdown took place in cuttings treated with the culture filtrates, or with solutions of purified enzymes. Plugs which stained with ruthenium red were found in the vessels after treatment with both heated and unheated solutions and could not be attributed directly to enzyme action.

It appears that the pectic enzymes are not involved in the wilting process [cf. **35**, p. 51], but are chiefly concerned with the breakdown of host tissues, which facilitates spread of the bacteria in the host.

Braun (A. C.). **Tissue culture as a tool for studying the development of autonomy in neoplastic plant cells.**—*J. nat. Cancer Inst.*, **19**, 4, pp. 753–759, 1 pl., 3 graphs, 1957.

This brief analysis of the factors concerned in growth and cell division in the light of studies of crown gall [*Agrobacterium tumefaciens*: cf. **37**, p. 12 *et passim*] and allied phenomena by the author and others was presented at the Decennial Tissue Culture Conference at Woodstock, Vermont, Oct. 1956. It is accompanied by the ensuing discussion (10 pp.).

Black (L. M.). **Viruses and other pathogenic agents in plant tissue cultures.**—*J. nat. Cancer Inst.*, **19**, 4, pp. 663–678, 1957. [72 ref.]

Tissue culturing of crown gall (*Agrobacterium tumefaciens*) and a possible causal virus, plant tumours incited by wound tumour virus, and of other plant tissues with viruses or with non-viral parasites was described and discussed at the Decennial Tissue Culture Conference, Woodstock, Vermont, Oct. 1956. The ensuing discussion is appended (7 pp.).

Salmon (Janine). **Premiers résultats sur la nature chimique des méats radio-opaques du tissu tumoral chez Pelargonium zonale.** [First results on the chemical nature of the radio-opaque meatus of tumoral tissue in *Pelargonium zonale*.]—*C. R. Acad. Sci., Paris*, **247**, 4, pp. 510–512, 4 fig., 1958.

It has been established that the radio-opaque meatus developing in the stem tissues of *P. zonale* inoculated with *Agrobacterium tumefaciens* [**37**, p. 12] is of a subero-ligneous nature. With methylene blue it turns sky-blue, an elective reaction in the presence of traces of ferric chloride.

Hussey (N. W.). **Notes on a fungus parasitic on greenhouse Whitefly.**—*Plant Path.*, **7**, 2, pp. 71–72, 1 pl., 1958.

Cephalosporium aphidicola [cf. **5**, p. 96] rendered inert in 24 hr. adults of *Trialeurodes vaporariorum* being reared at the Glass House Crops Research Institute, Rustington, Sussex. The eggs and active 1st instar nymphs were immune but all other stages were killed (93·4–100%) when sprayed with a spore suspension. The high humidity over a long period required by the fungus for germination seems to preclude its use for biological control. *Penicillium* sp. and *Cladosporium sphaerospermum* were also observed on dead whitefly scales.

Jernstedt (M. L.) & Mumford (D. C.). **Charges for commercially applied pesticides.**—*Bull. Ore. agric. Exp. Sta.* 566, 27 pp., 3 fig., 1 diag., 1 map, 1958.

A study of the work of 19 firms specializing in the application of fungicides, pesticides, weedkillers, and fertilizers on a contract basis. The figures presented, including a detailed analysis for 10 crops, illustrate the charges for the various types of work, and the great advances made in agricultural aviation.

Dreed (V.). **Use of surfactants with agricultural chemicals.**—*Agric. Chemic.*, **13**, 6, pp. 31–32, 121, 1958.

A popular note on important features of wetters, with emphasis on the improved results obtainable by correct choice for combination with a pesticide.

Andrade (A. C.). **Aspectos do emprêgo dos fungicidas em 1957.** [Aspects of the use of fungicides in 1957.]—*Biológico*, **24**, 4, pp. 55–63, 1 diag., 1958.

Potatoes accounted for 41·6% of the fungicides used in São Paulo, Brazil, during 1957, the corresponding figures for citrus, vine, tomato, and miscellaneous fruits being 26·3, 19·3, 8·1, and 4·9%. Zineb and maneb were most effective against potato blight (*Phytophthora infestans*), while Cu-containing preparations, e.g., Bordeaux mixture and copper Sandoz, are recommended for *Alternaria solani*.

Phytotoxicity is an important factor in the chemical treatment of vine diseases principally *Plasmopara viticola* and *Elsinoe ampelina*, var. Malaga, for instance, being very sensitive to Cu, while Seibel 2 and Isabel are more tolerant. It is recommended that 0·5% zineb should be applied from the onset of budding until after fruiting, when Cu may be substituted. Zineb and maneb are effective against berry rots, while ferbam stimulates production.

E. australis on citrus is best controlled by finely particulate Cu compounds like Sandoz or colloidal Cu.

The best results against [unspecified] tomato diseases have been given by manzate or dithane M 22 at 180 gm./100 l.

A table is given showing the amounts of individual fungicides imported into and actually used (roughly estimated at 400,000,000 l.) in São Paulo during 1957.

Mendes (O.). **Resultados dos ensaios realizados no campo de ensaios da Secção de Fitopatologia 1957.** [Results of tests performed in the experimental field of the Section of Phytopathology 1957.]—*Gaz. Agric. Moçamb.*, **10**, 109, pp. 162–166, 1958.

Further experiments are reported on the control of *Phytophthora infestans* on potato and tomato and of *Alternaria solani* on potato [**36**, p. 540]. The best control of the potato diseases was given by 8 applications at 10-day intervals of a mixture of Cu oxychloride and jecuzin, a zineb compound, next in order being dithane Z-78 and captan, while dithane Z-78 was most effective against tomato blight.

Wahlroos (Ö.) & Virtanen (A. L.). **On the antifungal effect of benzoxazolinone and 6-methoxybenzoxazolinone, respectively, on Fusarium nivale.**—*Acta chem. scand.*, **12**, 1, pp. 124–128, 4 graphs, 1958.

From the results of studies at the Biochemical Institute, Helsinki, Finland, it appears that these 2 compounds are fungistatic to *Fusarium nivale* [*Calonectria nivalis*] in Czapek's solution or oats-glycerol-agar at <0·5 mg./ml. and fungicidal at >0·6 mg. [cf. **36**, p. 234].

Eckstein (Z.), Hetnarski (B.), & Urbański (T.). **Chemiczne środki działające grzybobójczo. III. O pewnych pochodnych S-alkilo-i-fenylortęciowych 2-merkaptobenzimidazolu i 2-merkaptobenzoksazolu.** [Chemical methods of effecting the control of fungi. III. On certain S-alkyl and phenyl mercury derivatives of 2-mercaptobenzimidazole and 2-mercaptobenzoxazole.] —*Przem. Chem.*, **37**, 3, pp. 160–161, 1958. [Russian and English summaries.]

In further experiments at the Warsaw Polytechnic [**37**, p. 394] a number of new derivatives were produced by the reaction of alkyl-mercury halides with the Na salts of the 2 compounds. Similarly, the reaction of the Na salt of 2-mercaptobenzoxazole with phenylmercury acetate gave rise to S-phenyl mercury-2-mercaptobenzoxazole. All the new substances proved strongly toxic to *Fusarium culmorum*, *Alternaria tenuis*, and *Rhizoctonia* [*Corticium*] *solani*.

Härtel (K.). **Organic tin compound as a crop fungicide.**—*Quart. J. Tin Res. Inst.*, *1958*, 43, pp. 9–14, 9 col. fig., 1958.

A popular note on the work at the Farbwerke Hoechst A. G., Frankfurt/Main, arising from an earlier report of the fungitoxicity of organic tin compounds (Van der Kerk & Luijten. *J. appl. Chem.*, **4**, pp. 314–319, 1954), which led to the development of brestan [**37**, pp. 61, 394]. It is officially recommended for control of *Cercospora beticola* on beet, *Phytophthora infestans* on potato, and *Septoria apii* on celery, for the 1st and 3rd of which performance data are tabulated in comparison with other fungicides, but it is somewhat phytotoxic to a number of other important crops [loc. cit.].

Lindström (O.). **Mechanism of liquid seed treatment. Vapor action and adhesion, radioactive studies of initial liquid distribution, and investigations with radioactive panogen formulations.**—*J. agric. Fd Chem.*, **6**, 4, pp. 283–298, 2 fig., 2 diag., 14 graphs, 1958. [27 ref.]

This is a detailed, fully tabulated survey of an important joint study, using physical and chemical methods, by AB Casco, Stockholm 11, Sweden, and Panogen

Inc., Woodstock, Illinois, the results of which are summarized as follows. The mechanical distribution on treated wheat (chiefly), rye, oats, and sugar beet seed is governed by the mixing process in the treater and the vapour action of the fungicide [cf. **36**, p. 19]. These processes were investigated by means of volatile and non-volatile tracers and the distribution was characterized by statistical methods. High moisture content of the seed and inadequate mixing favour resorption, resulting in poorer initial distribution. A vapour pressure of 10^{-5}–10^{-4} mm. mercury gives a reasonably uniform final distribution. In dust treatment higher vapour pressures are necessary for an equivalent result, since the effective surface of the dust is less than the seed surface treated with liquid. Panogen penetrates the pericarp rapidly but diffusion is arrested at the endosperm. Liquid seed treatment may be further improved by reduction of the liquid volume.

Amtliches Pflanzenschutzmittelverzeichnis und Pflanzenschutzgeräteverzeichnis 1958 der Bundesanstalt für Pflanzenschutz, Wien. [Official list of plant protectives and plant protection equipment 1958 of the Federal Institute for Plant Protection, Vienna.]—*Pflanzenarzt*, **11**, *Sondernummer* 1, 43 pp., 1958.

On the same lines as before [**33**, p. 544].

Koch (H.). **Anerkannte Pflanzenschutzgeräte und Geräteteile.** [Approved plant protection equipment and component parts.]—*NachrBl. dtsch. PflSchDienst (Braunschweig)*, *Stuttgart*, **10**, 8, pp. 113–120, 7 fig., 6 graphs, 1958.

On the same lines as before [cf. **37**, p. 211].

Duffy (L.). **The care of spray equipment.**—*Agric. Chemic.*, **13**, 6, pp. 50–51, 3 fig., 1958.

A general note on the mechanical checking of power spray equipment before use, on servicing, and on cleaning and laying up afterwards. A service chart accompanies the article.

Higgins (E.). **Rot-proofing of textiles.**—*J. Text. Inst.*, **49**, 1, pp. 9–16, 1958.

In this lecture the author briefly referred to his attempts to produce a standardisable, soil-like medium possessing the physical qualities, water retention, base exchange, air permeability, etc., of a good tilth, but free from soluble salts and materials giving rise to them. Soil, the most reliable source of the organisms rotting textiles, is too variable for use as an experimental medium. In preliminary tests a medium with 50 g. each of china clay, dynamite-quality kieselguhr, double strength Thornton's medium (minus carbohydrate), and a sieved suspension of 2 g. horse manure in 100 g. water, was employed in tests of cloth samples and rope by Lloyd's method [cf. **35**, p. 211]. Addition of 0·4% NH_4NO_3 reduced from 17 to 8·3 days the time required for the reduction of the tensile strength of grey cloth from 30 to 2 lb.

Hueck (H. J.) & Luijten (J. G. A.). **Organo-tin compounds as textile preservatives.**—*J. Soc. Dy. Col.*, **74**, 6, pp. 476–480, 1958.

From the experimental results described and tabulated in this joint contribution from the Centraal Laboratorium T.N.O., Delft, and Organisch Chemisch Instituut T.N.O., Utrecht, Netherlands, it appears that mixed trialkyl tin compounds, especially diethyloctyl tin and diethyllauryl tin acetates offer considerable promise for the control of [unspecified] rots of jute and cotton in soil burial tests (supplemented by leaching for 36 hr. in running tap water). Diethyloctyl tin acetate was effective even at very low conc., while diethyllauryl tin acetate was remarkable for its resistance to leaching.

MICHALSKA (MME I.). **Flora grzybowa i bakteryjna jako czynnik niszczący wełnę owczą.** [Fungi and bacteria as wool destroying factors.]—*Acta microbiol. polon.*, **6**, 2, pp. 171–188, 7 pl. (19 fig.), 1 map, 1957. [English summary. 41 ref.]

The microflora of sheep fleece was found to be non-specific and typical of dung and decaying plant tissues. The most destructive genera present were: *Stemphylium*, *Cladosporium*, *Chaetomium*, *Sordaria*, *Trichoderma*, *Alternaria*, *Penicillium*, *Pestalotia*, and *Oospora*, together with *Streptomyces* sp. and bacteria.

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **6**, 8, p. 127, 1958.

Law No. 6968, of 15 May 1957, published in the *Resmí Gaz.* 9615, 24 May 1957, authorizes the establishment in Turkey of a General Directorate of Pest Control and Plant Quarantine [cf. **37**, p. 576].

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **6**, 9, p. 147, 1958.

The Disease of Plants (Prohibited Imports) Proclamation of 18 Jan. 1957, published in the *Fiji R. Gaz.*, *Suppl.* 3, 25 Jan. 1957, prohibits the importation of all plants without a permit, except for certain listed food products.

The Potatoes Importation Order (Guernsey, Channel Islands), 1958, applicable on 27 March 1958, concerns the phytosanitary certification of potatoes entering or trans-shipped through Guernsey from Europe, excepting France.

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **6**, 11, p. 174, 1958.

Decree No. 17847 of 21 Sept. 1956 from Argentina provides that imported hop rhizomes shall be submitted to post-entry quarantine. Decree No. 1252 of 4 Feb. 1958 authorizes the importation of suitably certified seed potatoes through Rosario.

The Plant Importation (Amendment) Rules of 12 Mar. 1958, published in *Govt. Gaz.*, **13**, 7 (2nd. suppl.), 1 Apr. 1958, amend the Plant Importation Rules (North Borneo) and require intermediate quarantine of plants from West Africa or tropical America and phytosanitary certificates for seeds.

Statutory Instruments, 1958, No. 1814. Pests. Destructive Insects and Pests. The Fire Blight Disease Order, 1958.—3 pp., London, H.M. Stationery Office, 1958.

This Order, operative from 6 Nov. 1958, requires growers of fruit trees infected by *Erwinia amylovora* in England and Wales [the disease was recently found for the 1st time in England] to notify the Ministry of Agriculture. Phytosanitary measures are authorized.

REESE (E. T.), CLAPP (R. C.), & MANDELS (MARY). **A thioglucosidase in fungi.**—*Arch. Biochem.*, **75**, 1, pp. 228–242, 4 graphs, 1958.

Information regarding the occurrence of thioglucosidases in fungi is stated to be very scanty. The present studies were undertaken at the Quartermaster Research and Engineering Center, United States Army, Natick, Massachusetts, in the belief that micro-organisms might be a more economical source of the enzymes required for improvement of flavour in processed foods than seeds of higher plants.

Of 300 fungi tested, *Aspergillus sydowii* (QM 31c) was the most efficient source of sinigrinase (defined as the fungal thioglucosidase acting on sinigrin), which resembled mustard seed myrosinase, but was more active on sinalbin and glucotropaeolin and less resistant to heat, acids, alkalis, and chemicals.

NEUFELD (H. A.), LATTERELL (FRANCES M.), GREEN (L. F.), & WEINTRAUB (R.). **Oxidation of *meta*-polyphydroxyphenols by enzymes from Piricularia oryzae and Polyporus versicolor.**—*Arch. Biochem.*, **76**, 2, pp. 317–327, 5 graphs, 1958.

A study at the Biological Warfare Laboratories, Fort Detrick, Maryland, of culture

filtrates and mycelia of *P.* [*Polystictus*] *versicolor* from lilac bark and *Piricularia oryzae* revealed, in addition to tyrosinase and laccase, an enzyme (for which the name metapolyphenoloxidase is proposed) which catalyses the oxidation of *m*-polyhydroxyphenols.

Grossmann (F.). **Über die Hemmung pektolytischer Enzyme von Fusarium oxysporum f. lycopersici durch Gerbstoffe.** [On the inhibition of the pectolytic enzymes of *Fusarium oxysporum* f. *lycopersici* by tannins.] —*Naturwissenschaften*, **45**, 5, pp. 113–114, 1958.

At the Institut für Phytopathologie und Pflanzenschutz, University of Göttingen, Germany, the culture filtrate of a highly pathogenic strain of *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* after the addition of tannin (0·001–0·1%) was tested for pectolytic activity [cf. **35**, p. 51 *et passim*] by maceration of potato slices and reduction of viscosity of a pectin solution. Even the lowest conc. caused a marked inhibition while the highest completely suppressed maceration in 3 hr. at 37° C. [cf. **35**, p. 385]. At 0·001%, viscosity fell from 100 to 71 and at 0·1% to 4 at 20°. The inhibitory influence of tannin began to operate after 1 hr.

Of various other tannins tested, only chebulinic acid exerted a comparable but considerably weaker effect.

Kooiman (P.). **Some properties of cellulase of Myrothecium verrucaria and some other fungi. II.**—*Enzymologia*, **18**, 6, pp. 371–384, 6 graphs, 1957. [French summary.]

Further studies at the Technical University, Delft, Netherlands (*Enzymologia*, **16**, p. 237, 1953), showed that the opt. pH for *M. verrucaria* cellulase [**36**, p. 47] after being heated for 5 min. in boiling water, determined viscometrically on carboxymethylcellulose, was 6 compared with 6·5 for unheated enzyme, while the corresponding opt. temps. were 42–45° and 55° C., respectively. The opt. pH for the conservation of heat stability was 7. The enzyme was precipitable by 4 vol. ethanol at 0° without reduction of activity, some 80% of which was lost, however, by 3 min. at 100°, 5 at 90°, or 10 at 80° (pH 6·1–6·3). Alkali-cellulose adsorbed a large part of the cellulase activity but scarcely any of that of cellobiase.

Heated cellulase barely attacked yeast-glucan, but it exerted a definite action on crown gall (*Phytomonas* [*Agrobacterium*] *tumefaciens*) polysaccharide, lutean, lichenine, and laminaran. A series of 3 oligosaccharides resulted from the hydrolysis of xylem by heated *M. verrucaria* cellulase.

Aspergillus flavus grew well on carboxymethylcellulose and alkali-cellulose but defatted cotton was a poor medium. The crude enzyme preparation from cultures on alkali-cellulose was active on reprecipitated, acid-swollen, and degraded celluloses, as well as on alkali-cellulose. The cellulase of this species retained some of its activity after 3 min. in boiling water.

Cultures of *A. nidulans* from alkali-cellulose produced a cellulase capable of hydrolysing alkali-cellulose, which, however, supported only scanty growth of *A. unguis* and *A. ustus* and none of *A. sydowii* or *A. versicolor*.

Wilson (E. M.) & Lilly (V. G.). **The utilization of oligosaccharides by some species of Ceratocystis.**—*Mycologia*, **50**, 3, pp. 376–389, 10 graphs, 1958. [29 ref.]

Liquid culture studies at West Virginia University, Morgantown, showed that *C. coerulescens* [**37**, p. 706] utilized maltose, sucrose, raffinose, and lactose. *C. fimbriata* did not utilize the last two, nor *Thielaviopsis basicola* [**34**, p. 309] the last.

Natarajan (S.). **Carbon-nitrogen metabolism of soil fungi. IV. Influence of carbon sources. V. Role of cyanide, nitrite, and sulphur.**—*Proc. Indian Acad. Sci.*, Sect. B, **47**, 6, pp. 338–344, 20 graphs; **48**, 1, pp. 28–32, 1958.

In the 1st of these further studies on *Fusarium udum* and *F. vasinfectum* [cf. **37**,

p. 214] mycelial mat wt. and N content of the mats were taken as criteria of growth. With each of 5 inorganic N sources the C sources fell into the same order of efficiency, viz. fructose > sucrose > maltose > glucose > mannose > lactose > mannitol > galactose > sorbitol. The rate of N metabolism was a function of the C source.

In the 2nd study it was found that nitrates were reduced irrespective of the C source. The nitrate reductase in these fungi is insensitive to KCN.

Bazzigher (G.). **Der Wuchsstoffbedarf zweier phytopathogener Pilze.** [The growth substance requirements of two pathogenic fungi.]—*Phytopath. Z.*, **32**, 4, pp. 352–358, 5 fig., 1958. [English summary.]

In tests at the Eidgenössischen Anstalt für das forstliche Versuchswesen, Zürich, both *Endothia parasitica* [**36**, p. 796; **37**, p. 251] and *Trametes radiciperda* [*Fomes annosus*] required supplemental growth substances for development in addition to the nutrients available in a Knop glucose solution. An appropriate test with *E. parasitica* on chestnut showed that the presence of such growth substances in the host can be demonstrated. For both fungi the combined action of certain substances is essential to growth. There are, however, a number of such combinations, of which 1 component is always a N compound: the others are either certain vitamins or coenzymes. *E. parasitica* is apparently capable of utilizing all the intermediate N products which occur in the amino-acid-protein metabolism of the host, of which the most effective combinations are mixtures of thiamine or thiaminepyrophosphate-cocarboxylase with glutamic acid, aspartic acid, glutamine, or asparagine. It requires both thiamine and biotin for the utilization of NH_4NO_3, whereas *F. annosus* requires only thiamine.

Erb (W.). **Beiträge zur Physiologie der Gattung Merulius.** [Contributions to the physiology of the genus *Merulius*.]—*Zbl. Bakt.*, Abt. 2, **111**, 16–20, pp. 505–529, 1958.

An outstanding feature of the results from this comprehensive study at the Botanisches Institut der Technischen Hochschule, Karlsruhe, Germany, was that *M. himantioides* [**32**, p. 519], *M. hydnoides*, *M. molluscus*, *M. sclerotiorum* 141 A (Forest Products Research Laboratory, Princes Risborough), and *M. tremellosus* [**34**, p. 619] readily assimilated cellulose. Organic N-compounds were preferred to inorganic. Of particular interest was the generally high intake of γ-amino butyric acid. The bright yellow pigments produced by *M. himantioides* and *M. sclerotiorum* were somewhat like those of *M. lacrymans* [**33**, p. 2]. They could be isolated from the medium by extraction with ether or adsorption on charcoal; the conc. solutions are deep red. The antibiotic spectrum of the yellow-pigmented (as opposed to the colourless) culture filtrates extended over both Gram+ and Gram—bacteria, the effects being specially remarkable on *Pseudomonas aeruginosa*.

Briefly discussing the systematic position of the species in the light of these studies, the author rejects the identification by Jahn [**22**, p. 49] and Harmsen [**33**, p. 513] of *M. hydnoides* and *M. sclerotiorum* with *M. pinastri* [**32**, p. 158] on both morphological and physiological grounds. The sclerotia (5–6 mm. diam.) of *M. molluscus* observed by Harmsen both *in vivo* and *in vitro* failed to develop in any of the numerous cultures in the present investigations.

Riedhart (J. M.) & Porter (C. L.). **Studies of a unique pigment complex and a photobiological reaction in Penicillium herquei.**—*Mycologia*, **50**, 3, pp. 390–402, 1 fig., 4 graphs, 1958. [29 ref.]

A more detailed account of studies on a strain of *P. herquei* (the identity of which has been confirmed) [**37**, p. 578].

Sermonti (G.) & Morpurgo (G.). **Riattivazione con cloruro di manganese di conidi inattivatti con azotoprite in Penicillium chrysogenum.** [Reactivation by manganous chloride of conidia of *Penicillium chrysogenum* inactivated by 2,2′-dichloro-*N*-methyldiethylamine.]—*R. C. Accad. Lincei*, **24**, 1, pp. 96–99, 1 fig., 1958.

The inactivated conidia were again capable of producing colonies after 3–4 days' incubation at 24° C. on a nutrient medium containing 0·4–0·8% $MnCl_2$. The compound did not reactivate conidia inactivated by X- or ultra-violet rays.

Saraswathi-Devi (Miss L.). **Problems and techniques involved in trace element essentiality studies with fungi—a critical appraisal.**—*Proc. Indian Acad. Sci.*, Sect. B, **48**, 2, pp. 96–108, 1958. [52 ref.]

This general note touches on methods of determining trace element requirements, sources of trace element contamination, purification techniques, and the use of fungi in the estimation of trace elements [cf. **35**, p. 394].

Terui (M.) & Kagawa (H.). **The influence of gibberellin on the growth of some plant parasitic fungi.**—*Bull. Fac. Agric. Hirosaki Univ.* 4, pp. 88–91, 1 fig., 1958.

The addition of 1·35 mg. gibberellin/15 ml. potato decoction agar+2% sucrose reduced the growth of *Sclerotinia* [*laxa* f.] *mali*, and *Helminthosporium sativum* [*Cochliobolus sativus*] by about half, that of *Cephalothecium* [*Trichothecium*] *roseum* and *Gibberella fujikuroi* slightly; *Penicillium expansum* and *Piricularia oryzae* were hardly affected.

Kavanagh (F.), Tunin (D.), & Wild (G.). **Antibiotics formed by species of Emericellopsis.**—*Mycologia*, **50**, 3, pp. 370–372, 1958.

Work at the Antibiotics Manufacturing and Development Division, Eli Lilly & Co., Indianapolis, on the formation of cephalosporins N and P [cf. **31**, p. 345] by 7 species of *Emericellopsis* and 1 presumed *E.* sp. is described. Appreciable amounts of cephalosporin N were produced by *Cephalosporium* sp. (C.M.I. 41,937) [49,137], *E. salmosynnemata*, *E. terricola* var. *glabra*, and W.S.F. 47. C.M.I. 49,137 was the only fungus to form both cephalosporins.

Řeháček (Z.). **Produkce antifungálního nově isolavanou aktinomycetou.** [Production of an anti-fungal antibiotic by a new actinomycete isolate.]—*Čsl. Mikrobiol.*, **3**, 1, pp. 27–31, 1958. [Russian and English summaries.]

A morphological and physiological study is reported from the Czechoslovak Academy of Sciences, Prague, on actinomycete 943, isolated from the rhizosphere of oats and considered to be identical with *Actinomyces* [*Streptomyces*] *globisporus* [substrain] *flaveolus* and closely related to *S. alboflavus*. It produces a substance strongly antagonistic to *Fusarium nivale* [*Calonectria nivalis*], *Cladosporium cucumerinum*, *Alternaria solani*, and *Candida albicans* (av. diam. of zone of inhibition > 20 mm.), and moderately or slightly so to a number of other species, including *A. tenuis*, *F. bulbigenum*, *F. oxysporum*, and *F. solani* (15–20 mm.), *Penicillium digitatum*, and *P. italicum* (< 15 mm.).

Hendriks (B.) & Berends (W.). **On the sensitivity to light of polyene fungicides.**—*Rec. Trav. chim. Pays-Bas*, **77**, 2, pp. 145–153, 1958.

Of recent years various fungicides with a polyene structure [**37**, p. 21] have been isolated from streptomycetes. This is a study at the Technological University of Delft, Netherlands, of the physiological activity of pimaricin [cf. **37**, p. 258], its capacity to suppress respiration in *Saccharomyces cerevisiae* and *S. lactis*, and its

inactivation by ~5μg./ml. riboflavin in ~445 mμ light (provided by an Osram high-pressure mercury lamp and a blue filter).

Lindenfelser (L. A.), Pridham (T. G.), Shotwell (O[dette] L.), & Stodola (F. H.). **Antibiotics against plant disease. IV. Activity of duramycin against selected micro-organisms.**—*Antibiot. Ann., 1957–8*, pp. 241–247, 1958. [Abs. in *Biol. Abstr.*, **32**, 9, pp. 2670–2671, 1958.]

Lindenfelser (L. A.), Pridham (T. G.), & Kemp (Carolyn E.). **V. Activity of cinnamycin against selected micro-organisms.**—Abs. in *Phytopathology*, **48**, 8, p. 395, 1958.

In further work [cf. **36**, p. 339] duramycin, a new polypeptide antibiotic isolated from the antibiotic F-17 mixture produced by *Streptomyces cinnamomeus* f. *azacolutta* (NRRL B-1699), at under 100 μg./ml. inhibited *Corynebacterium fascians*, *Pseudomonas cattleyae*, *P.* [*medicaginis* f.sp.] *phaseolicola*, *Xanthomonas phaseoli*, *X. campestris*, *Diplodia zeae* [*D. maydis*], *Helminthosporium victoriae*, *Ceratocystis ulmi*, *Phoma destructiva*, *Rhizoctonia* [*Corticium*] *solani*, and *Sclerotinia sclerotiorum*.

A polypeptide antibiotic produced by *Streptomyces cinnamomeus* f. *cinnamomeus* (FRRL B-1285] was generally ineffective against Gram— bacteria, but killed Gram+ rod bacteria, including the 1st 4 mentioned above, and *Botrytis allii*, *Cercospora musae* [*Mycosphaerella musicola*], *Diplodia maydis*, *Corticium solani*, and other fungi.

Burges (A.). **Micro-organisms in the soil.**—188 pp., 2 diag., 4 graphs, London, Hutchinson University Library, 1958. 10*s.* 6*d.* [175 ref.]

A primarily ecological survey is given of fungi, bacteria, actinomycetes, algae, nematodes, and protozoa, with emphasis on the 1st 2 groups. After chapters on soil and its structure and the contained organisms the author reviews methods for examining populations of these groups; investigations into the form in which they occur in the soil (active or resting); their distribution; ecology; roles in the C, N, and mineral cycles; the influence of man; and the concept of the soil as a system in dynamic equilibrium.

Guillemat (J.) & Montégut (J.). **Troisième contribution à l'étude de la microflore fongique des sols cultivés.** [Third contribution to the study of the fungal microflora of cultivated soils.]—*Ann. Épiphyt.*, **9**, 1, pp. 27–54, 10 fig., 1958.

In this part [cf. **37**, p. 214] details are given of the mycoflora of plots lacking N, P, or K fertilizer compared with one given no fertilizer since 1902 and one given NPK. Samples were taken on 22 May 1957 at 0, 5, 10, 20, and 40 cm. depth.

The mineral content of the soil directly affected the frequency of the different species present as determined by the dilution plate method. In the NK, PK, NP, and NPK plots increased frequency of species was 26%, 36%, 65%, and 88%, respectively, of the unfertilized. This series is analogous to the effect of these minerals on the yields of cultivated plants.

The positive effects of the fertilizers upon the 106 spp. detected (mostly saprophytic) were always greater than the negative effects. All spp. of Moniliaceae were favoured by fertilizer, especially *Penicillium canescens* in the N and P plots, while *P. lilacinum* was less selective. The behaviour of Dematiaceae appeared variable, but indicated that their development is more closely related to superficial plant débris than to the mineral content of the soil. The different treatments had little, if any, effect upon the Sphaeropsideae. The relative frequency of Mucorales and ascomycetes was not high enough to show any increased development in the fertilized plots. Opt. frequency was at 10 cm. The phycomycetes (5 Mucorales and 1 *Pythium* sp.) were most sensitive to humidity.

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CONTENTS

AUTHORS' NAMES

Allam, 17
Alonso, 49
Alvarez L., 49
Anderson, 40
Andrade, 57
Andrén, 27
Ashour, 17
Ashworth, 5
Askew, 23
Athow, 50
Atkinson, 12
Azzam, 50
Baba, 2
Bachy, 23
Bagnall, 26
Bald, 8
Bant, 9
Bartz, 29
Bawden, 35
Bazán De Segura, 52
Bazzigher, 62
Beaumont, 9
Becker, 42
Beemster, 25
Bell, 19
Benda, 34
Bercks, 46
Berends, 63
Berger, 29
Bernstein, 47
Betto, 50
Björling, 27
Black, 57
Blodgett, 18
Bömeke, 12
Bonilla, 49
Bontea, 43
Bowman, 26, 31
Boyce, 6
Boyd, 15, 48
Boynton, 14
Braun, 56
Braverman, 9
Brennan, 16
Brierley, 7
Broadbent, 24
Browning, 1
Buckman, 42
Bucur, 43
Burges, 64
Burghardt, 46
Calavan, 4
Calo, 38
Campbell, 41
Cárdenas, 49
Carlson, 19
Carlsow, 42
Cation, 13, 18
Caudwell, 53
Cervantes, 2
Chamberlain, 12
Chandler, 8
Childs, 3
Chiu, 44
Christiansen, 4
Clapp, 60
Clear, 40
Cleary, 9, 53
Coe, 37
Cohoon, 16
Conkey, 42
Conroy, 30
Costa, 3
Covar, 23
Cowling, 41
Croegaert, 5
Culot, 5
Cunningham, 10
Daines, 16
Day, 38
Desai, 2
Diachun, 10
Dih, 44
Drachovská, 47
Dreed, 57
Driver, 28
Duffy, 59
Dunleavy, 50
Dyachenko, 51
Dye, 17
Dyula, 37
Eckstein, 58
Eichhorn, 3
Embleton, 22
Erb, 62
Ervin, 4
Etheridge, 39
Everette, 36
Fisher, 14
Flaatten, 27
Foa, 50
Forbes, 33
Försund, 27
Fulton, 18, 19, 21
Garber, 5
Gäumann, 37
Georghiou, 12
Gerlach, 6
Gersonde, 41
Giacometti, 3
Giamalva, 52
Gibson, 40
Gilmer, 13
Glasscock, 13
Goheen, 53
Gorovets, 47
Gothoskar, 34
Graham (D. P.), 40
Graham (J. H.), 11
Grechushnikov, 28
Green, 60
Grogan, 52
Grossmann, 61
Guillemat, 64
Halisky, 5
Hall (D. H.), 52
Hall (H.), 31
Hansen, 15
Harrison, 19, 24
Härtel, 58
Heath, 55
Heathcote, 24
Hendriks, 63
Henry, 39
Henson, 10
Hepting, 39
Hetnarski, 58
Hewitt, 53
Heyland-Steinhilber, 44
Higgins, 59
Hildebrand, 31
Hille, 1
Hoestra, 23
Hollings, 7
Horn, 52
Horovitz, 23
Houston, 5
Hueck, 59
Hull, 18
Hunter, 12
Husain, 56
Hussey, 57
Hwang, 27
Jacobsen, 24
Jenkinson, 10
Jensen, 16
Jernstedt, 57
Jerome, 16
Jiménez, 23
Kagawa, 13, 63
Kavanagh, 63
Kelman, 56
Kemp, 64
Kennedy, 1
Khudyakov, 53
Kimble, 52
Kirchen, 42
Kleczkowski, 35
Kliewer, 1
Klos, 17, 18
Klug, 6
Knowles, 5
Koch (F.), 46
Koch (H.), 59
Kohlmeyer, 42
Kooiman, 61
Kortsen, 52
Koulounev, 44
Kozlov, 53
Krimbas, 53
Kublanovskaya, 5
Kwong, 14
Labruyère, 29
Larson, 26
Latterell, 60
Laut, 39
Leach (C. M.), 10
Leach (R.), 22
Lenz, 8
Leone, 16
Lilly, 61
Lindberg, 12
Lindenfelser, 64
Lindström, 58
Link, 7
Lister, 19
Lo, 6
Lorenz, 31
Lovitt, 19
Luijten, 59
Macfarlane, 43
Malaguti, 23
Malmus, 45, 47, 48
Mandels, 60
Manor, 44
Martin (F.), 33
Martin (H.), 23
Martin (J. P.), 4
Martin (W. J.), 31
Mason, 24
Massey, 8
Mazunina, 43
McClellan, 8
McDonald, 11
McGrew, 21
McKay, 40
Meier, 25
Mendes, 58
Menon, 23
Michalska, 60
Miller (P. M.), 13
Miller (P. W.), 38
Millikan, 11, 40
Monk, 23
Montégut, 64
Montgomery, 14
Morgan, 42
Morpurgo, 63
Morvan, 12
Moulton, 19
Mühle, 9
Mumford, 57
Musgrave, 2
Muskett, 51
Naegele, 8
Nagaraj, 23
Nariani, 52
Natarajan, 61
Natti, 2
Neergaard, 54
Neufeld, 60
Niederhauzer, 2
Nikitina, 29
Noll, 47
Norman, 3
Ocfemia, 23
Ogawa, 16
Okamoto, 15
Olofsson, 27
Orth, 45
Oruinbaev, 30, 31
Oshima, 39
Osterwalder, 15
Oswald, 26, 31
Pag, 6
Painter, 38
Patino, 36, 48
Paton, 15
Paulus, 8
Pires, 33
Po, 26
Popkova, 28
Porter, 62
Post-Bakker, 51
Pratt, 19
Price, 21
Pridham, 64
Printy, 22
Probst, 50
Proebsting, 15
Puerta, 49
Purnell, 40
Putt, 9
Quevedo Díaz, 28
Raski, 53
Rawlings, 38
Rebmam, 18
Reddy, 2
Reese, 60
Řeháček, 63
Reyes Leal, 36
Richardson, 49
Ridé, 15
Riedhart, 62
Riley, 26
Rodríguez, 2
Rudakov, 6
Rudorf, 24
Salmon, 57
Salt, 29
Sanders, 5
San Juan, 36
Sarasola (A. A.), 51
Sarasola (M. A. R. De), 51
Saraswathi-Devi, 63
Sauthoff, 6
Sawamura, 42
Schlegel, 34
Schneider, 3
Schöniger, 20
Schreier, 54
Schultz, 45
Schulze, 41
Schuster, 35
Sciarowi, 8
Sermonti, 63
Sewell, 13
Shanks, 7
Sharma, 8
Shotwell, 64
Simons, 37, 52
Slykhuis, 9
Smith, 7, 8
Snyder, 31
Stahmann, 34
Steib, 33
Stodola, 64
Stolze, 45
Sturgess, 21
Sutic, 15
Sy, 6
Takase, 28
Tang, 5
Taylor (E. A.), 8
Taylor (R. E.), 42
Terui, 13, 63
Thompson, 21
Torpen, 15
Trojan, 8
Tsao, 4
Tunin, 63
Twomey, 18
Uevich, 50
Urbánski, 58
Van Emden, 29
van Wambeke, 5
Varma, 52
Venkataramani, 33
Virtanen, 58
Volpi, 50
Von Gregory, 30
Waggoner, 13
Wahlroos, 58
Walker, 14
Wallihan, 22
Wallin, 26
Wang, 27
Ward, 14
Wartenberg, 30
Watson, 23
Weathers, 4
Wehrmeyer, 34
Weintraub, 60
Weltzien, 11
Wenham, 8
Wenzl, 28
Wetter, 26
Wild, 63
Williams, 25
Wilson (E. M.), 61
Wilson (W. F.), 52
Wood, 52
Woodhead, 14
Wu, 44
Yakovleva, 12
Yamaguchi, 36
Ynalvez, 23
Younts, 2
Yuen, 44
Zaumeyer, 48
Zentmyer, 22

SUBJECT INDEX

Actinomycetes, 5, 31, 63
Antibiotics, 2, 15, 17, 63–64
Bacteria, 30–31
Books, 64
Diseases and disorders of:
  Apple, 12–15
  Banana, 21–22
  Cereals, 1–3, 54, 56
  Citrus, 3–5
  Coffee, 5
  Cotton, 5
  Fibre plants, 5–6
  Flowers and ornamentals, 7–9
  Fruit, 12–23
  Herbage crops, 9–12
  Hops, 23
  Mushrooms, 52–53
  Officinal plants, 38
  Palms, 23
  Paper pulp, 42
  Potato, 24–32, 56
  Rubber, 32
  Sugar beet, 44–48
  Sugar-cane, 32–33
  Tea, 33
  Textiles, 59
  Tobacco, 34–36
  Tomato, 36–38
  Trees and timber, 38–41
  Vegetables, 42–44, 47–52, 54
  Vine, 53–54
Fungicides, 1, 57–59
General publications, 54, 55
Legislation, 60
Physiology, 9, 56, 60–63
Reports from Banana Board, Jamaica, 22; Coffee Research Station, Tanganyika, 5; East Africa, 55; Grenada, 21; Malaya, 55; Plant Prot. Service, Copenhagen, 54; Sugar-Cane Technologists, India, 32; Tea Sci. Dep. United Planters' Assoc., S. India, 33; Welsh Plant Breeding Sta., 54
Soils and fertilizers, 64–65
Systematic mycology, 1
Virus diseases, 2, 3, 4, 7, 9, 12, 16, 18–21, 23–26, 31, 34–37, 44–45, 52, 57